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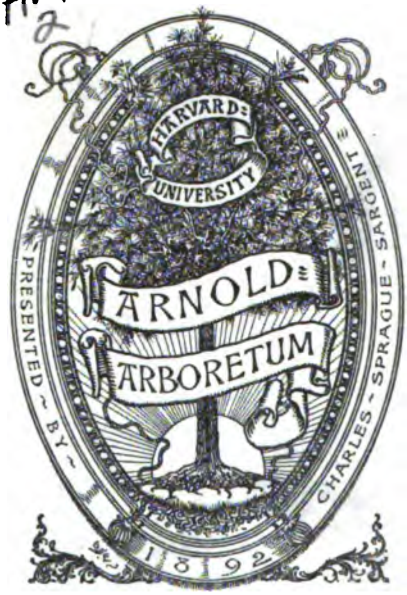

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A MONTHLY JOURNAL
FOR THE PLANT LOVER

JULY, 1901

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THE AMERICAN BOTANIST

VOL. I. JULY, 1901. No. 1.

BALDER'S BROW.

BY C. F. SAUNDERS.

One of the most familiar of weeds is a certain little plant with bushy, finely dissected foliage, which we have all seen on urban commons and vacant lots where the grass is kept close cropped by goats and goslings. In the country its favorite haunt is back of the barn and in the lane, though sometimes, too, we find it out front by the road in the congenial company of such democratic herbs as pigweed, ragweed and milkweed. Late in June it begins to display its pretty flowers which are exact duplicates of the ox-eye daisy, except that they are not so large as the latter.

All through the summer these daisy-like blossoms may be seen cheerfully nodding to simple souls that find pleasure in quiet, everyday beauty; but should you be tempted to gather a bunch of the flowers, you will find the plant has so unpleasant and weedy an odor that you will probably throw your posy away in disgust. This rank smell is a characteristic which gives a key to one of its common names, to wit, the fetid chamomile *(Anthemis cotula).* It is indeed a poor relation of that bitter chamomile which is so important an item in the winter supply of medicinal herbs wherewith old-fashioned country housewives still hang the garret rafters.

Common as it is on Uncle Sam's farm, the plant is by no means an aboriginal American, but an immigrant within a couple of hundred years from Europe. Like many another weed that we pass by daily without a thought, it has brought with it a memory that invests it with an atmosphere of romance; for in its old home in northern Europe it was associated with the gods and known as Balder's Brow. Balder, best beloved in the Norse Valhalla, and a sort of Scandinavian counterpart of Apollo, the sun god, was fabled to be of a presence so bright and beautiful that wherever he went he shed light around him. Not unnaturally, therefore, our little flower, with its golden yellow head and aureole of white rays like conventionalized sunbeams, was to the popular mind of the frigid North, emblematic of the favorite deity at whose coming cold and darkness fled and summer reigned in the earth. This fancy was preserved in the name that the people gave the flower, and to this day, it is said, the name is current in Sweden and in some rural districts of Northern England, though in the latter country the word has become curiously corrupted into Baldeyebrow.

So by the mouth of a wayside weed would the ancient spirit of skald and viking speak to the twentieth century American and lift him a little, if may be, out of the fever and hurry of a too sordid life into the immaterial realm of fancy.

Philadelphia, Pa.

DEVASTATION OF NATURE.

By G. Armington Sayre.

A fundamental principle in the higher education of botanists is embodied in the simple lines—"To love the flower and leave it on its stalk." To do this requires more heroism than the majority of collectors possess. Whether they ever make the effort to thus grow in grace depends upon the motive for collecting and the amount of inborn avarice in the individual.

Legitimate collectors of ferns and wild flowers may be classed under three heads: Commercial, scientific and cultural. The commercial collector sees possible dollars and cents in each plant of any rare species he may chance to find, but if he is a discreet man he will realize that it will be years before the plants, just starting, will again replenish his pockets. Financial considerations naturally outweigh aesthetic value, although he may, or may not, have an appreciation of the beauty of his stock in trade. The collection and sale of living plants or herbarium specimens is a perfectly legitimate business; but there is no excuse for devastating Nature's choice retreats or of exterminating her best works of art for greed of gain.

On the other hand the scientist argues that anything sacrificed in behalf of science is praiseworthy. To be able to add facts to a known science requires the wholesale slaughter of much innocent beauty. Anatomical peculiarities can only be discovered by dissection and rigid investigation of many specimens; hence extinction of a species often follows in the wake of the *friend* (?) of the cause.

The culturist is more likely to have a keener appreciation of the real beauty of the ferns and wildings than collectors of either of the other two classes; for with him aesthetic value has not given place to sordid considerations. He not only loves the ferns and wild flowers, but appreciates them from an artistic standpoint; he wishes to make them grow where they can be seen and enjoyed with less trouble than in their native haunts. He also must have a surplus of material to draw from, for only certain forms and stages of growth will fit into the various places he wishes to fill. All of this may be done with careful selection.

But alas! the gospel of *moderation* is everywhere in order, and a plea that Nature's sylvan dells be not roughly dealt with, and that this sort of vandalism be checked before her choicest treasures are exterminated. Granted that nobody *owns* the wild things growing, and that nobody can "stake a claim," yet the smallest soul among us should feel conscience smitten for laying greedy fingers on pictured walls too exquisite to touch even for a laudable purpose. "I shall never pass this way again, and no one else is likely to follow in my footsteps; for no one else cares for these things as I do," is a common excuse for making a clean sweep of a rare "find." Others say to themselves, "If I do not take it somebody else will," and the beautiful growth which Nature has taken years to perfect is ruthlessly torn up. We all "know a bank where the wild thyme blows," and if we are discreet we will keep our knowledge to ourselves, though it seems hard not to invite a trusted and congenial friend to share the feast of fat things which we feel sure the gods have spread for our especial pleasure in some secluded nook. But the vandal is in our midst and no one knows in what guise he may appear, therefore we had best be wary.

One of my lady friends who is discretion itself in these matters, ventured to take a missionary, whom she was entertaining, to see the view from one of her favorite resorts. The aforesaid lady missionary was a wandering planet, with no scientific taste in evidence, no home to decorate or friends to bestow botanical gifts upon. Nobody dreamed that her eyes would alight upon a rare growth jealously guarded by my friend; but her hands were with difficulty restrained from pulling it all up. Soon after, as she moved on to other entertainers, she revealed the secret and personally headed an expedition to the place, which ended in exterminating the species from that locality. This form of looting may not be punishable according to civilized codes, but if cannibals *should* eat her on her return to heathen lands—they might do worse.

Notwithstanding the advice of an ancient dame, viz: "When yew're gittin', git a plenty," an injunction should be placed on irresponsible parties who wantonly tear up plants simply because they are pretty, only to throw them aside as soon as they begin to fade. A genuine devotee of nature is sure to have a wild-garden away from the "madding crowd" where the higher delights of the spirit may be cultivated. Gibson had his orchid retreat; Thoreau his checkerberry patch; while lesser lights, with varying tastes, find consolation in other wild flowers and ferns. Placard your wild garden if you like, but find mine if you can.

SOME PHASES OF PLANT DISTRIBUTION.

BY WILLARD N. CLUTE.

There seems to be no accounting for the way in which some plants are distributed over certain sections of country. Who is there who cannot recall some long and careful search for a plant which ought to grow in his own locality, but which must always be set down among the missing, although common enough just over the border in the territory of a rival. No matter how well stocked with botanical rarities one's own collecting grounds may be, it is always exasperating to reflect that some common weed has not been found, especially if he knows of spots in which every condition for its growth seems favorable. The situation is aggravated if the adjoining territory holds some particularly active botanist who thoroughly enjoys sending you rare specimens from his own region with a tantalizing note suggesting that your collecting ground is not of much account if it cannot match his own in the matter of that particular plant.

One gains a temporary satisfaction when he manages to ferret out specimens of the same plant from his own region, or better still, finds something new with which to give his friend "a Roland for his Oliver," but so long as his own section is not credited with all the common species that, according to the botanical manuals, should be there, he is not likely to rest satisfied.

There are several of these plants missing from my own locality that I am sure would have been reported long ago if this merely depended upon careful searching to bring it about. One of these is the wild indigo *(Baptisia tinctoria)* so common in the sandy soil of Long Island, New Jersey and parts of New England, not to mention localities further south and west. We seem to be well within the limits of its range, but not a plant is to be found. And yet, we barely miss it, for in journeying hither from New York, we constantly see its great globular tufts of green in dryish places as the train toils up the Delaware valley, and it is not until the final spurt is made over the summit and down into the Susquehanna valley that *Baptisia* drops out of the race. Not ten miles beyond our region it grows, and Dr. C. F.

Millspaugh even found a few specimens upon our side of the divide, but none have been found since. We live in hopes that the clan may yet get up courage enough to span the few miles that still separate us.

A characteristic species of the Delaware valley unaccountably absent from our region is the red or river birch *(Betula nigra)*. It is scarcely possible that it could have been overlooked with us, for the tree, especially in winter and spring, is so easily distinguished from its companions on the river banks that it can be identified with certainty from long distances. It is common again in the Susquehanna valley in Pennsylvania, but apparently does not cross the line into New York. Why it does not is a mystery.

A companion of the wild indigo, the partridge pea *(Cassia chamaecrista)* is another species that we would gladly welcome to a place in the Upper Susquehanna Flora. Like all other species that become too common, this is in many sections considered a weed to be classed with the poke, Jimson weed, rag-weed and toad-flax, but in my own opinion the sections in which the roadsides are bordered with the pretty pinnate leaves and bright yellow flowers of this species are to be congratulated. I never tire of the sight of its golden flowers, and could connive at spreading such a " weed " with good grace.

Two related species, the wild senna *(C. Marilandica)* and the wild, sensitive plant *(C. nictitans)* find a home with us, but the partridge pea holds itself aloof. That it will grow and thrive here is proved by the fine specimens that at present are growing in my garden from seed gathered on Staten Island late in the autumn of last year. Although *Cassia nictitans* is called the sensitive plant, the leaves of the partridge pea also respond promptly to stimuli. They close at a touch, though so slowly that the eye does not perceive the motion. The sensitiveness to the contact of foreign bodies seems to vary with the day. After being whipped about by the wind for some time it is much less sensitive.

I find a similar state of affairs to exist in the true sensitive plant *(Mimosa pudica)* of the Tropics. The leaves of this plant droop and close instantly upon being touched, appearing to melt down like snow before a fire. Pressing the plant for the herbarium is a difficult matter on this account. By the time one has broken off a branch, every leaf has closed. After carrying my specimens for some distance, however, I was surprised to find that they were becoming resigned to the situation and again opening their leaves. Putting them in the press gave them a new and different shock and they "melted" again before the straps on the press could be tightened.

Our roadsides, river banks and old fields are strewn thick with the common evening primrose *(Oenothera biennis)*, but we search in vain for specimens of its daylight counterpart, the sundrops *(O. fruticosa)*, which the Manuals persist in calling common. It is not unknown in southern New York, but in my immediate vicinity it is entirely absent. One must see the two species blooming together to realize how superior to the evening primroses are to those which flower by day.

Until last year we had been looking for the dwarf sumac *(Rhus copallina)* without success. "Rocky hills," says Gray's Manual, indicating its habitat, but here, where rocky hills are at a discount, it is exceedingly rare. It may be noted that it does not appear to be restricted to rocky places, for it grows abundantly in the sandy soil of Long Island. In any event, it is rare with us. I know of only one clump in a territory of more than five hundred square miles.

The list of species which it would seem ought to be plentiful in the Susquehanna valley, but which are not, is a long one, and includes such common plants of other localities as the whitlow-grass (*Draba verna*) rock rose (*Helianthemum canadense*), the pinweeds (*Lechea*), of which not a specimen is to be found in certain counties ; the *Arethusa* and the painted cup (*Castilleia coccinea*). The whole area drained by the Upper Susquehanna has been sufficiently explored to assure us that these plants are nowhere common. Whether in the changes of the plant covering they will ever become so, remains to be seen.

GARDENING IN INDIA.

The gardeners of the North Temperate Zone, who, tiring of battling with such small game as aphide, snails and moles, long for a more adventurous life, might try their craft in India. The gardener's life there is anything but monotonous, as the following from *Indian Gardening and Planting* shows:

In India, gardening is carried on under difficulties such as seldom present themselves in Europe. One of the charms of an English garden is that one can seat himself on a bit of grass without the fear of death haunting him; for there are no snakes and other venomous vermin to disturb his peace of mind. Out here it is different, for one can scarcely turn over a stone in the garden without finding some crawling thing beneath it.

The authorities of the Royal Botanic Gardens, Calcutta, have to contend against various wild beasts. In 1879 the Curator of the Garden was mauled by a tiger, which had found its way into the garden. Jackals are permanent residents in the garden. They devoured a goat quite recently, and were it not that the swans and geese are carefully guarded, there would not be much left of them. Turtles infest the ponds and lakes, and are destructive creatures, eating up any choice aquatic that may be planted out. They have a peculiar weakness for young *Victoria regia* plants, and it is for this reason that this queen of water lilies cannot be grown in these gardens. The latest addition to the carnivora of the gardens is in the shape of crocodiles, for which the recent floods are probably responsible. One of these saurians, which had taken up its permanent quarters in one of the lakes in the gardens, was shot a few days ago by Mr. N. Gill, the Assistant Curator of the gardens, who intends to preserve the specimen. Snakes, scorpions, centipedes, huge red ants, venomous caterpillars, and insect pests of all sorts are, like the poor, always with us. In the mofussil, matters assume a more serious aspect. Porcupines are frequent visitors, and do a lot of damage. Wild boars are even more destructive, for they have a fondness for roots, and beds of carrots, turnips, etc., are much sought for. We remember a wild boar hunt in the "Ram Newas" public gardens at Jeypore, in Rajputana, when a "sounder" of six tore through a galvanized wire fence and caused havoc in the gardens. Four of the visitors were accounted for. Leopards used to destroy the animals in the deer park in the same gardens, and it was not until after many nights of sitting up that the marauders were accounted for. It was not an uncommon experience for the Superintendent to find a pair of leopards promenading round his dwelling house in the gardens. He always slept with a loaded rifle by his bedside. Perhaps the most destructive pest that the Indian gardener has to contend against is the white ant. Nothing is safe from this termite. Wood, whether living or dead, is attacked. Even iron work is not safe from its attacks. Other wild beasts, in the shape of wolves and hyenas, are not unfrequent visitors. Field rats are also a scourge, and when a swarm of locusts descends on a garden, scarcely a leaf is left. These are some of the "diversions" that vary the monotony of the Indian gardener's life.

THE OPENING OF A FLOWER.

It was late in an afternoon of August that I sauntered into my garden, having a little season of leisure to spend there. The buds of the Four-o'clock or Marvel of Peru had just begun to unroll. Why not watch the unfurling of a flower, which was to spend its odors on the night and shrivel with to-morrow's sun? The common things are those which few people see, nor care or think to see. To the true observer there is nothing great and nothing small, for all things are alike marvelous and noteworthy; nothing is commonplace, all is miracle. So I sat in the garden-path before the lusty Four-o'clock bush, with its hundred blossom-buds, singling out one for special eyeing.

Watching the bud carefully I felt rather than saw that it was slowly, very slowly unrolling before my eyes. To behold such a phenomenon one may see sharpest where he looks askance, as he would look at a chimney where the smoke was so attenuated that he knew not whether what he saw was smoke, or only his wish to see smoke; or as he would look ahead for approaching objects when driving in a dark night,—not by straining the eyes, but giving them the local rein to dilate to their full.

So this swelling and uncurling of the flower was more like the work of the imagination than something which the eyes noted. At times a movement was visible, when a fold that had been held, leapt, on being freed, or a stamen curled suddenly on its long filament. Gradually, slowly, how slowly, the trumpet opened; and ere too wide, as if in wisdom, it prepared for fertilization in good time against any chance honey-hunter. The anthers perched upon the tips of the slender filaments went through an exquisite blossoming act of their own —five little flowers within a flower, I might say. They formed the most charming part of the whole dainty exhibition. At first each of these anthers was like a pair of tiniest buns that had been baked together back to back in the same pan. They were nicely balanced on the end of the gracefully upcurved filaments. Soon, along the line marking the lid that fitted in the top of each of these biscuit-like anthers, a crack appeared; wider and wider it grew, higher and higher rose the lid, till it stood on end, and back to back with the lid of its little twin, which had risen with a rhythm to match its own. Then the under sides, which proved only nether lids, moved downward, downward till they were reflexed against the filament. Within these upper and lower lids little masses of golden pollen were disclosed on their little stalks. Five little anthers were all hatching at once.

And then, the flower was slowly pumped fuller and fuller of juices, becoming a more perfect trumpet every second, until it stood a finished blossom in the deepening twilight. The last rose-draperies hung as the flimsiest filament of mist high in heaven, the trailing garments of departed day, where in the deep blue sky the lamp of the evening star, already gleaming seemed but a benedictive closing of the scene, while that sweet penetrating odor, which drifts so far on the humid night air, published the readiness of the Marvel-of-Peru to receive its anticipated hawk-moth callers,—its patrons really,—exchanging a drink of nectar for a little help in the way of a few grains of pollen smeared on the stigma of the pistil that seed might mature.—*Ernest Waters Vickers in Popular Science News.*

FLOWERING OF THE BAMBOO.

The bamboos are the largest of the grasses, but unlike our common grasses, very rarely flower. When flowering does occur it is something of an event, as may be seen from the following account from the *Indian Forester :*

A somewhat remarkable event is taking place in the Chanda district of the Central Provinces, and that is the flowering on a large scale of the ordinary bamboo *(Dendrocalaemus strictus).* The area over which the flowering extends is estimated at 1,200 square miles, and in this area, although a few clumps here and there have escaped, the phenomenon is universal. But the extraordinary point about it is that clumps of all ages are flowering —not only mature clumps, but quite slender seedlings of six or seven years' growth, or even less. I send you some specimens to illustrate this; the rhizomes show that those clumps are quite young. Last year the droughts affected the bamboos in the Dhaba Range of this district, and the bamboo flowered over a small area, and produced a kind of manna. Many thousands of people were kept alive for some weeks on the seed. This year the area is infinitely larger, and the whole population will, in course of time, flock to the forests to gather the seed.

The consequences to the people in the vicinity of this flowering and subsequent death of the bamboo will be rather serious, as for many years to come, they will not be able to find sufficient stores to satisfy the numerous wants of the agricultural population to the north and west of Chanda—at any rate, the price of bamboos will be very much higher. The Government revenue which now amounts to about Rs, 20,000 from this source, will also suffer, as when the dead bamboos have been utilized, there will be no more available for some fifteen years or so. It would be interesting to ascertain whether such a universal flowering of this particular species has been recorded before. Needless to say, the oldest inhabitant has no recollection of such an event, and the flowering of the smallest clumps is believed to be unique. It is probable that in this district at least, the bamboo does flower gregariously over fairly large areas, as three of the eldest inhabitants informed me that they had seen the bamboo flower twice: first, when they were about ten years old. Their ages were probably quite seventy. Hence it is not unlikely that his bamboo flowers at intervals of about thirty years.

NOTE AND COMMENT.

Short articles and notes on anything of interest relating to plants are solicited from our readers for this department. Make a note of your interesting experiences and afford others pleasure.

A Hardy California Flower.—The California Poppy *(Escholtzia)* endured the severe winter of 1900-1 in southern New York and came up in many places from self-sown seed. The bright, yellow poppy-like flowers make a very pretty show. Those who would add a new feature to the landscape, might encourage this flower to become a " weed."

The Potato Bug and the Nightshade.—It is said that until the potato begun to be cultivated as far west as Colorado, the bugs did not trouble them, being content to eat the native species of night-shade *(Solanum)*. Many of these latter have prickly leaves, and the smooth-leaved potato must have appeared much like pie to bugs used to spines and thorns. That this diet agrees with them seems proven by the way they have since thrived.

THE PRICKLY PEAR.—The Ohio species of cactus, *Opuntia humifusa,* has an interesting habit which seems to be a protective measure against cold. At the approach of winter the flattened stems lose their upright position and press themselves closely to the surface of the ground. The stems lose considerable of their moisture at the same time, becoming wrinkled, but not flaccid. By the end of April they are again upright and distended.—*Ohio Naturalist.*

PLANTS OF THE HIGH ANDES.—At a meeting of the Linnaean Society of London, on April 4th, a paper was read by Messrs. W. B. Hemsley, F. L. S., and H. H. Pearson, F. L. S., on a small collection of dried plants made by Sir Martin Conway in the Bolivian Andes in 1898-99. This collection contained but forty-six species, but these were of special interest from the great height at which they were found, *i. e.* between 18,000 feet and 18,700 feet above sea-level. The highest Andine plants on record were stated to be *Malvastrum flabellatum,* Wedd (one of the mallows) and a grass, *Deyeuxia glacialis, Wedd.—Gardening World.*

STRANGE PARTNERSHIPS.—If we look closely into Nature we find many strange partnerships. Perhaps the strangest and most interesting of all is that of plants living in partnership with insects for their mutual welfare. The plant is a Mexican tree, *Acacia sphaerocephala,* and its partner, a pugnacious species of ant. The branches are armed with singular double thorns, from which feature it is known as the Bull's Horn Acacia. These thorns are very hard but hollow. At the base there is a soft spot which is easily pushed in and makes a passage into the hollow of the thorns. It is in these hollows that the ants live with their heads filling up the holes. When an insect attempts to climb past one of these the ant rushes out and destroys it, but does not, as might be supposed, live on its prey. Its food is provided by the plant in the form of little grain-like growths at the tips of the pinnae, so that by this partnership the ants protect the plant in return for food and shelter.

EDITORIAL.

Within the past few years the study of nature in America has received a wonderful impetus. Twenty-five years ago books upon natural history were exceedingly few, and the standard works were mostly by British authors. The increased interest in the subject, however, has brought about a great change, and the book-sellers' shelves are now loaded with books by American authors on plants, birds, bugs and mammals, while the press is full of announcements of forthcoming volumes upon the same and kindred subjects. We are becoming an out-door people, and the rise of such pastimes as wheeling, golfing, camping and tramping, has not only made it fashionable to know something about the marvellous forms of creation that meet us on every hand, but has also considerably increased that body of students who, fashionable or not, will continue to be interested in the ways of plants and animals. To supply information about plants and to supply it in language that the general reader can understand, is the province of THE AMERICAN BOTANIST.

In order to insure accuracy in botanical literature, it is necessary to use the scientific names, but in all cases where there are common names for the plants mentioned in this journal, such names will be given also, thus making the contents available to the flower-lover as well as to the strict scientist. Articles and notes suited to our needs are solicited from all into whose hands this number comes.

It is not necessary to be a prominent scientist to write an article that will interest the flower-lover. Very frequently the prominent scientist is the poorest person that could be chosen for such a task, for he usually gets so deep into some specialty as to lose all sense of what might be called botanical perspective. The things that would interest us, he passes by as too trivial to waste time upon. As an indication of what is wanted for this journal, may be mentioned records of the increase or decrease of any species, of the finding of rare species, the effect of environment upon plants, the uses made of our native species, the names by which they are known to farmers and "herb-doctors," and the meaning of such names, experiments in cultivating and propagating our plants—in short, we want articles upon any subject connected with the recently recognized science of plant-ecology.

To people accustomed to the trend of modern botanical studies, the title we have selected for our journal might at first seem a misnomer. Judged by present standards, a botanist might be defined as a gentleman engaged in wrangling with his fellows about obscure points of nomenclature or counting hairs and scales in desperate attempts to make two species out of one. Turning to the dictionary, however, we find that a botanist is "one versed in the knowledge of plants." That is exactly what this magazine aims to be, and we invite all who are interested in such subjects as the color and fragance of flowers, the uses and folk-lore of plants, and the curious facts in the behavior of any species to become subscribers. The magazine will always be edited with an eye to their interests.

It may be questioned whether any journal devoted to popular botany can secure enough original matter of the proper kind to fill twelve numbers yearly. It is the common experience that every magazine we take up contains certain articles of interest, interspersed among many that are too technical for any but a limited number of specialists. While we shall use original matter for the bulk of THE AMERICAN BOTANIST, we shall also make a feature of re-publishing everything of a popular nature appearing in other botanical journals, thus forming a sort of botanical review and enabling our readers to get a survey of the whole botanical press by subscribing to a single journal.

Having issued what we believe to be an interesting number, and promising that succeeding numbers will be even better, we rest in the confidence that lovers of plants will show their appreciation of the enterprise by subscribing. We have been especially gratified by the large number of cash subscriptions received in response to a circular recently sent out, although this circular did not ask for a remittance until copies of the magazine had been received and examined. It is also a pleasure to note the fact that many who received our circular sent us the names of others who they thought might be interested, and so helped to spread a knowledge of the journal. If any receive this number and do not care to subscribe, they will do more than one a favor by handing it or mailing it to some flower-loving friend. All are requested to send us the names of friends who they think would be interested in receiving a sample copy.

Twice before in the history of botanical literature an "American Botanist" has been issued by others. Without being at all superstitious, we still look forward to the " charm " that is always said to accompany the third attempt. The magazine will be sixteen pages in size until a thousand subscribers are secured. After that, four pages will be added for every two hundred subscribers gained. Every subscription counts toward a larger journal. Shall we be favored with yours ?

BOOKS AND WRITERS.

—The Southern California Academy of Sciences announce the early publication of an Annotated Catalogue of the plants of Southern California, by S. B. Parish.

—In the autumn, Messrs. Doubleday, Page & Co. will begin the publication of *American Country Life,* a monthly magazine for lovers of out-doors.

—The McMillan Company have recently issued a charming and well-illustrated volume on botany for the general reader, entitled " Flowers and Ferns in Their Haunts," by Mrs. Mabel Osgood Wright.

THE AMERICAN BOTANIST

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THE WOODSTOWN LILIES.

By Edwin C. Jellett.

Perhaps one of the most beautiful—certainly one of the most striking of our native plants—is the American Nelumbo (*N. lutea*), locally known to plant lovers as the Woodstown lily. About this time of the year, one living in Eastern Pennsylvania or in Western New Jersey, is apt to see an announcement that the rare Woodstown lilies are preparing to bloom, or else may read that a party of enthusiastic botanists, upon a day's outing, has appeared at Woodstown to collect the rarest of American wild flowers, as it is believed by many that the Woodstown mill-dam is the only spot where the plant is to be found. Indeed if a reporter who is anxious to fill his paper with an account of something new and strange, does exaggerate a little, and if on seeing the notice, an eager flower gatherer, without consulting his book, starts at once for the home of the wonder rare, bent on securing a few of its blooms before it be too late, I shall not blame; for independent of the lilies and the mystery of their location, the "Woodstown mill-dam" is a most inviting place, and the country about it is a paradise for botanical students and collectors.

Picture a beautiful pond, and at one corner of it an old-fashioned mill, with near-by, a high stone breast, over which the water surges until it rises in spray from a rocky pool below, while above, a line of weeping-willow trees almost hides the falls and the mill from view. Where the water narrows a single-span wood bridge crosses, from which one may follow the whitened waters tumbling down the ravine until lost to sight, or turning, may, at the far away end of the upper dam, see an interminable number of sulphur-yellow globular flowers, plentifully surrounded throughout by upright leaves, standing, sentinel-like, high out of the water, as though they knew why they were there. An occasional seed-rod, conical and immature, showing its head, appears as an uneasy intruder, while underneath, large, smooth, green, depressed leaves, cover the surface of the water so completely that not until the outer line of vegetation is reached does the water become visible.

This is the Woodstown mill-dam, "where lilies blow," and the smallest boy who dabbles in its waters is proud of it. The gentle murmur of falling waters follow us, and above, from pine top to pine top, kingfishers cross and recross the lake, ever on the alert for prey. Ceaselessly they chatter as they race, and in marked contrast with the more peaceful wrens and swallows, who keep close to the lower eaves of the old mill, making so little noise that their presence might never be suspected.

It is a rare treat to see the Woodstown lilies at their best, and while the plant is plentiful at several points not many miles distant, the knowledge lessens our interest not a whit, for let the oldest inhabitant of Woodstown believe he has the "only pond of lotus lilies in the United States," and that the aggregation of plants there, was started by "seed brought down by the wild ducks from Canada." The possession may be all in all to him, but we know that the beauty so lavishly bestowed at Woodstown is elsewhere, and elsewhere must be as beautiful, and bright, and as free as the sun, which everywhere gives to beauty both light and life.

Germantown, Pa.

A PLANT IMMIGRANT.

By Willard N. Clute.

One of the redeeming features of rubbish heaps, ballast grounds and waste lands is that they furnish a lurking place for numerous wanderers and outcasts of the vegetable kingdom.

Many of these have long ago ceased their travels and have become squatters on every available inch of soil, as the jimson-weed and Jerusalem oak (*Chenopodium botrys*), while others like the human tramp appear in one place to-day and another to-morrow, ever restlessly wandering over the face of the earth. Now and then, among these traveling species, one chances upon a plant of better estate, just as an occasional honest working-man, out of a job, is found among the tramps. Often these plants, like the working-man, can look back to more prosperous days, when they had an acknowledged position in the world. Of this class, I count the white campion or evening lychnis (*Lychnis alba*), which strayed into my collecting grounds for the first time this year, and which I decided to make the most of, fearing that it might move on to pastures new another year.

This species is doubtless an escape from some old garden, for the flowers are attractive enough to be valued, and are fully the equal in beauty of many kinds that are given a place among cultivated things. The plant scarcely behaves like a true immigrant; there is nothing in its bearing which betokens an intention of conquering the new world for itself. It seems quite satisfied with a few inches of earth in which to root and cares not at all for admiration. During the day, when botanists are abroad, it has an ordinary and weedy look and it is not until evening, when the botanist has betaken himself to his books, that it unfurls its pretty white flowers and sends a delicate perfume into the night as a notice to the insects. Apparently insect visitors are of prime necessity, for the flowers are usually diœcious. In the staminate plant, the clustered anthers appear at the top of the corolla "tube," encircled by a delicate ruffle formed by the crown of the petals. The pistillate plant, on the contrary, has its styles and stigmas projecting nearly half an inch beyond the rest of the flower, in order to be sure of obtaining any pollen that may chance to pass.

There is a noticable difference in the appearance of the two forms of flower, so much so that one might easily mistake the staminate plant for the night flowering catch-fly (*Silene nocti-*

flora). The calyx and claws of the corolla form a slender tube quite unlike the tube of the pistillate flower. The calyx of the latter is inflated by the swollen seed-pod at maturity, but even before it begins to sustain pressure from the swelling pod, it is much larger in diameter than those calyces which never expect to bear fruit. The full grown seed-pod is of itself an attractive object with its ten little notches at the top where the seeds escape.

The vitality some of the flowers possess is amazing. A spray carelessly thrown aside after examination in a cool room was found the next evening in full bloom, although it had been without moisture of any kind for a day.

WILD FLOWERS IN THE GARDEN.

To a lover of wild flowers many of the cultivated forms commonly found growing in small gardens lack much of that irresistible charm and attractiveness possessed by their indigenous relatives. Yet how seldom do we find people who are trying to cultivate the wild flowers! One is led to presume that people choose to pass by the delicate and graceful native flowers for the often bold and showy but not more beautiful varieties figured in such brilliant colors in florists' and seedsmen's catalogues—a presumption which I fear is but too true. These people can see no beauty in the flowers of our fields and hillsides, simply because they are common and can be had for the gathering, and because Nature instead of a professional florist has propagated them. There is an opinion among many that native plants will not succeed if brought into the garden—an opinion which is without foundation if the conditions of the garden can be made somewhat similar to those of the field. But many native plants when brought into the garden are planted where the temperature, soil, amount of moisture, sunlight and shade are very different from the natural conditions under which the plants have been growing, with result that the plants vary to such a degree as to lose much of their native beauty and attractiveness, even though they thrive. This is probably why native plants are not more commonly seen in cultivated gardens. There is, however—and with much pleasure I notice it—an increasing tendency on the part of nurserymen and plant dealers to include in their lists of hardy plants many of our common ferns, shrubs and flowering plants. One dealer of whom I know sends out a catalogue containing nearly all the ferns of the region in which it was published, as well as many of the flowering plants like columbine, bloodroot, hepaticas, anemones, cypripediums, asters, goldenrods and many others. Then, too, there are shrubby plants like laurels, viburnums, dogwoods, elders, hawthorns and roses, to say nothing of native trees. This tendency is indicative of a healthy condition and growth in the progress of popular gardening. For it is by using natives and growing them as naturally as possible rather than by using foreign plants, of which they know little or nothing, that the masses will create the most pleasing views in their planting. If they follow Nature, people will not go far astray. A corner of one's place, at least, should be devoted to native shrubs and plants, and unless the cultivator be exceptionally fond of glitter and show he will probably find it the most attractive and interesting spot of his garden. To what flower can we attribute a more shy or delicate grace than to the nodding columbine (*A. Canadensis*), as it peeps from a secluded nook between the rocks? Though its native habitat is the summits and slopes of rocky hills in sun or partial shade, it will thrive equally well in the garden. I have seen it grow and flower profusely when along the north side of a building, in a place scarcely ever reached by sunshine. What early spring plant is more charming than the rue anemone? This season I chanced to come upon a fine specimen while roaming over a rocky hill. The flowers were well opened, but I took it home and gave it a place in the garden. It did not seem to mind being transplanted, and for nearly two weeks was a source of great delight to every one who beheld it, being a mass of continual bloom. I am interested to know if it will find a congenial home in my garden. The bird-foot violet (*V. pedata*), thrives well in cultivation, but is inclined to grow much larger than in its native habitat. Usually it is found only upon dry and rocky elevations, where there is little soil—which may perhaps account for its small size. In a rich, sunny garden one would scarcely recognize it. Both leaves and blossoms are much larger, and the plant frequently grows twice or three times its ordinary height. In certain places this species may be used with good effect as an edging. Probably no plants can be employed along the north side of a building that will give so much satisfaction and make such an attractive border as our native ferns. These are especially good against a brick foundation, uniting the structure with the lawn. The ostrich, cinnamon, sensitive, christmas, regal and maiden hair ferns are especially good for this purpose, though some of the others are nearly as desirable. Transplanting may be practiced at any time during the season, though probably it can be best done in late autumn or early spring.—*From an article by W. E. Britton, in American Gardening.*

NECTARIES OF THE BRACKEN.

The presence of nectar-producing organs among many flowering plants is a matter of common knowledge, but the occurrence of such nectaries among ferns seems scarcely known. They are known, however, in three genera of tropical ferns and in addition our common bracken (*Pteris aquilina*) possesses them in abundance. Prof. F. E. Lloyd, who has been studying their structure, says of them in a recent number of *Science:* "The nectaries in *Pteris aquilina* occur on the fronds at the bases of the pinnæ and pinnulæ on the morphological lower side of the leaf. The largest and most conspicuous are the lowermost, that is, those at the bases of the first pair of pinnæ. On one developing frond, therefore, one may observe a complete developmental series. When examined macroscopically the glands appear as approximately oval areas just below and extending somewhat into the angles formed by the mid-veins of the first and second, and second and third, orders. The external surfaces of the glands are smooth, because of the absence of the chaffy scales found elsewhere on the young frond. Their color is brown-red in the central part of the nectarial surface, developing into red on the edges. Later the red color is lost, and the organs are then deep green. The secretion of nectar is very abundant during the unfolding of the frond. So abundant is it in fact, that large beads of the limpid fluid may be seen from a distance, resting on the nectaries or running down the petiole. With a hand lens, one may easily note the accumulation of nectar after the surface has been wiped off. Darwin found that a drop of the liquid was formed in six minutes. Handling and tasting the secretion shows it to be sirupy and very sweet. According to Bonnier the sugars saccharose and glucose are present. Here, as in analogous organs in other plants, the exudation is quite independent of bleeding pressure. Leaves which have been broken off continue to produce nectar for some days, provided, of course, that they be kept in fair condition. As the frond ages, the activity of the glands is lowered, until they finally cease to secrete and become functionless as nectaries."

Prof. Lloyd finds the surface of the glands to have a dozen or more pores scattered over them from which the sugary solutions ooze, and believes the pores to be similar to the ordinary "breathing pores" (*stomata*) of the leaf. In the bracken the stomata are absent from the stems except for two bands of stomata, one on either side of the flattened upper side of the stems, and the glands arise at points along these bands. In offering an explanation for the presence of the nectaries the author says: "F. Muller pointed out that in Brazil the fern is visited by an ant of which a leaf-cutting species stands in dread. To this Francis Darwin answers that the plant has few natural enemies—meaning, presumably, in England, though this is equally true, so far as observation goes, in North America. Francis Darwin further suggests, in view of the possible weakness of the above explanation, that the gland is either an organ which was formerly of use and is now passing away, or that it is connected 'with some unknown process of nutrition. That its activity 'is decidedly connected with the growth of young fronds' stands in favor of the latter view."

Those who have had occasion to examine our plant in spring, must have noticed the great number of large black ants to be found on the unfurling fronds. Whether their visits are of advantage to the plant is not apparent, although it is certain that they are attracted by the nectar.

VARIETAL AND SPECIFIC NAMES.

Generic and subgeneric names are expressions of arbitrarily formed groups which have justification simply in their convenience. From a Darwinian standpoint, these groups must contain species which are not less related to one another than to species assigned to other genera or subgenera. There is to be, in fact, a natural continuity or contiguity as with the inches on a foot rule. But granting this, it is then a matter of taste or custom how large such divisions may be made. The subgenera of one generation or one author are often the genera of the next. Species and subspecies, on the other hand, are units isolated by nature. It is not a matter of taste how many species exist, though one might imagine so, to read the current botanical literature. Ultimately we shall have to know how many forms stand physiologically isolated from one another and these will be recognized as true species. Subspecies are similar, except that at some point the isolation is as yet incomplete. The word variety may as well be abandoned as a distinct category; but it is useful as a refuge when we do not know the proper status of a plant. The "form" (*forma*) is really something different. As I understand it, it expresses a phase existing wholly within specific limits; a result of the variability of the organism, spontaneous or induced by external conditions.—*T. D. A. Cockerell in Torreya.*

NOTE AND COMMENT.

INTRODUCTION OF POTATOS.—Potatos, when first introduced to Russia in 1769, and being known as "Devil's Apples," gave rise to serious rioting.—*Gardening World.*

ANTIDOTE FOR IVY POISONING.—According to *Popular Science News,* Nature has provided a most efficient remedy for poison-ivy poisoning, in the shape of the widely spread flower known as spotted touch-me-not (*Impatiens fulva*). It is also called the jewel-weed, and is very abundant in the water courses during June and July, when the poison-ivy (*Rhus toxicodendron*) and the poison sumac (*Rhus venenata*) are most poisonous. The remedy is applied by expressing the juices of the plant and applying it to the skin which has been poisoned. Who can say whether there is any virtue in this remedy?

PREPARATION OF COCOA.—The so-called cocoa-beans are borne in melon-shaped pods on low trees, similar in appearance to plum trees. Each pod contains a hundred or more "beans" embedded in a mucilaginous matter. At maturity the seeds are taken from the pods and undergo a process of sweating to free them from this mucilage—at least this is the modern way. A writer in the *Bulletin* of the Botanical Department of Jamaica, however, says that in Trinidad barefooted coolies walk over the drying beans and in this way take up the mucilage.

THE MAN-EATING TREE.—Much of what the magazines are printing on out-of-door subjects, at present, falls under the head of "Newspaper Science," which is well known to be no science at all. Here is a good example from a recent number of the *Woman's Home Companion* in regard to a most remarkable man-eating tree: "There is no tree in the world so peculiar or horrible as the man-eating tree of Madagascar. Shaped like a pineapple, growing to the height of eight feet, from the top hang down enormous leaves, while towering above are five or six long white palpi, which bend and bow in the breezes like some uncanny thing. The Carls Ruhe *Scientific Journal* some time ago gave a fine description of this wonder and its shrieking worshipers. At certain times in the year large meetings are held, where wild incantations and weird dances take place. Finally, when the excitement is at its height, one woman, whóse fervor surpasses that of the other worshipers, approaches nearer the tree, drawn irresistibly on by her fanatical zeal until she steps on the leaves, in order to drink of the sweet liquid that lies at its base in a sort of inverted plate. Then the inert mass of leaves that stretches from the base to nearly the top of the tree, and which is two to three feet thick, the lower part of each leaf being three feet wide and filled with stiff hooks, suddenly warms to life, and as the unfortunate victim sinks into a delicious sleep she is grasped in the clutches of these cruel hooked leaves. The slender palpi droop and fold about her. The larger leaves acting more slowly, but none the less surely, steadily bind and press until the victim is completely obliterated." This is fairly like what the sundew might appear to a mosquito or small fly, but as for a plant large enough to eat human beings, we may add with the *Companion*, "There is no tree in the world so peculiar or horrible!"

LARGEST FLOWER OF THE PEA FAMILY.—The *Bulletin* of the Botanical Department of Jamaica, records the flowering there, in April, of that member of the pea family which bears the largest flowers of any of its tribe. The plant—*Camvensia maxima*—is a native of Africa, and when discovered by the botanist, Welwitsch, bore flowers a foot long. One may gain some slight idea of the appearance of single blossoms by imagining a sweet pea or locust blossom increased to the size of a large cabbage. At Hope Gardens, Jamaica, the vine is growing over a calabash tree on the lawn. It produced two racemes of flowers, one with thirteen, and the other with eight blooms. The flowers measured ten and one-half inches from the base of the sepals to the tip of the standard, the latter being nine inches high and four and one-half inches broad. The petals are pure white, with edges beautifully crisped and of a golden hue. The standard, in addition, has a deep shading of yellow down the centre, breaking up into small, irregular patches of pure gold near the apex. When in flower, this must be a truly magnificent sight. Welwitsch describes it as "a robust shrub climbing to a great height and then hanging down its graceful branches."

ANOTHER COMPASS PLANT.—A closer study of our plants has shown that the leaves of many of them have a decided polarity. One of the best examples to be found in eastern gardens is the prickly lettuce *(Lactuca scariola)*, whose leaves, turned edgewise and pointing mostly north and south, are sufficiently noticable to attract the attention of even the casual observer. A writer in the *Ohio Naturalist* notes a similar peculiarity in the leaves of the common fleabane *(Erigeron Philadelphicum)*, although in this plant the plane of the leaves may lie in any direction.

NUMBER OF OUR FERNWORTS.—With an increase in the study of our ferns the number of species is found to be considerably augmented. Mr. B. D. Gilbert's recently issued "North American Pteridophytes" enumerates 266 species, 55 sub-species or varieties and 115 lesser forms of ferns and fern allies in North America north of Mexico. Mr. Gilbert's is the most complete list of these plants ever issued in this country.

THE ANTS AND THE PARTRIDGE PEA.—On each leaf-stalk of the Partridge Pea (*Cassia chamaecrista*), about half way between its junction with the stem and the lowest pair of leaflets, is a small gland about the size of a pin head slightly raised above the surface of the leaf-stalk. It is circular or somewhat lozenge shaped in outline and no doubt many who have examined the plant have wondered as to its utility. Some lesser forms of creation, however, seem not to have been bothered on this score, but have laid the plant under ceaseless contribution. In the center of the flat upper surface of each gland there is a tiny opening just visible to an attentive eye, from which a viscid substance constantly oozes, forming a tiny globule. This seems exceedingly attractive to the common brown ant. From dawn until twilight the glands are carefully tended, each ant seeming to claim the tip of a separate branch as its own, and visiting all the glands upon it with great regularity, reminding one of a like proceeding on the part of the yellow-bellied woodpecker after he has sunk a series of wells in maple or birch. The advantage to the plant in thus feeding the insects is not apparent, unless by this method it confines their attention to the leaves and so escapes the wasting of the pollen in the flowers. Perhaps some one can suggest a better explanation.

THE ARCTIC FLORA.—"In the polar regions," says *Review of Reviews,* "the winter lasts far into April; in May the temperature rises quickly and July is the warmest month in the year, while in August the sun's radiation decreases. The explosion-like awakening of the polar plant life is also a result of these sudden changes. In eight days the snow melts; green leaves and blossoms cover trees and ground which a week before were covered by deep winter snow. The higher north, the swifter is this change from winter to summer. The rapid progress in the maturity of the Arctic vegetation is also explained by the peculiar constitution of the floral organisms. The buds of blossoms and leaves are formed in the fall. When the warm season sets in the buds have only to uncover and mature. In reality these polar countries are veritable deserts, and the resources to fight the nature of a desert are same in the Arctics as they are in the Sahara, inasmuch as the plants of both regions have organisms allowing the greatest possible economy with usable water. The root sytem is very shallow, usually but five to fifteen cm. deep; in greater depths there exists such a low temperature that no humidity can be absorbed from it. The stem is covered by a more or less heavy bark, and grows above ground usually with only a few thin branches and leaves. These leaves indicate the water-saving nature of the plants. They are usually grouped in rosettes, small and rounded, seldom parted and often as hard and stiff as fir leaves, leathery or thickly fleshy."

YELLOW PINE CIGARS.—According to *The Forester* the needles of the western yellow pine (*Pinus ponderosa*) are now being used as a partial filling for cigars, "imparting a flavor not the least disagreeable, and calming to the nerves." Pacific Coast "Havanas" may yet crowd the various cabbage leaf brands out of the market!

OUR NATIVE HAWTHORNS.—Certain genera of plants in which there is considerable tendency to variation have afforded the modern species-makers no end of employment. In these genera the segregation of "new species" has reached a point where it is extremely difficult, if not impossible, for one not a specialist to perceive the differences. Those who are fond of poking fun at this school of scientists, assert that the differences between the species of violets are now so small that in order to identify a plant one must not only know when and where it was collected, but *who collected it!* The hawthorns are the latest plants to receive attention of this kind from the scientist. A decade ago our best botanists were satisfied that there were about ten species of hawthorn (*Crataegus*) in Eastern America. Now we are gravely assured that there are no less than one hundred and twenty! These additional "species" are founded upon slight variations in the original ten, but the wisdom of considering them of full specific value, equal to the species first known, seems doubtful. Some of the characters depended upon are such trival ones as size of the calyx lobes, whether they are reflexed or spreading, a difference of two in the number of stamens, the color of the anthers, size and color of fruit, length of the fruit pedicels, etc. Those who have ever closely observed plants under cultivation will be willing to subscribe to the statement that differences like those mentioned may be found in seedlings from a single plant. The June *Plant World* prints an article from which our facts are gathered, but the editor wisely observes "the present tendency toward an inordinate multiplication of species will result some day in a violent reaction."

EDITORIAL.

In subscribing for a new publication, one must always take into consideration the amount of value to be gotten out of it. If one desires mere paper and ink he is recommended to buy a New York Sunday paper; if he wants general literature he should try some of the big magazines; if he wants technical articles on abstruse subjects there are various botanical journals; but if he wants information on flowers and flower-lore we are sure there is nothing better that THE AMERICAN BOTANIST. There are many of us in the position of the man who said he liked everything about flowers except Botany. It is our intention to keep out of our publication the particular kind of botany he had in mind. We are making no advances to the dry-as-dust scientist, being engaged solely in offering to the lay reader entertaining and reliable matter about our plants. It is, however, a pleasure to find the names of many scientists (not the dry-as-dust kind) among our subscribers and we hope ultimately to get all who are alive to the beauties of plant life on our lists. Our present readers will therefore pardon an occasional word for ourselves in this column, and perhaps themselves help on the work of securing subscribers by speaking of the journal to others.

The prices charged for the early volumes of many botanical journals seem to indicate that from a merely speculative standpoint, the purchase of these when issued is a very good investment. In two years Vol. 1 of *Rhodora* has appreciated fifty per cent.; the first five volumes of *The Fern Bulletin* are quoted at an advance of from thirty-three to one hundred and seventy-five per cent., while certain volumes of *The Forester* have increased in value four hundred per cent. in half a dozen years, single numbers of some issues being quoted at $1.00 each. Few investments in the business world can show better returns.

One of the best ways to get thoroughly acquainted with a wild plant is to set out specimens in your garden. You may visit the same species in the field many times, but you will never get beyond a mere "speaking acquaintance" with it there in comparison to the degree of familiarity attained when it becomes a resident on the borders of the lawn or in some shady fence-corner, where it may be visited at all times of the day, and if desired, at night also. Still more interesting, because each day some new trait unfolds with the developing plant, is the raising of mature plants from seed. An exchange bureau, to which one could send seeds of the interesting plants of his locality, and obtain seeds of others, might be of value to many correspondents. If those who are interested will notify us, a bureau of this kind will be arranged in the autumn and a list of seeds for exchange mailed. to each contributor. Exchangers should prepare to collect twelve packets of one kind, and for these, may select ten different packets from other localities. Among those plants which would seem most desirable for this purpose are the marsh mallow, musk mallow, the showy asters and golden rods, and other composites, the gentians, the sea pinks and the members of the rose and pea families. It should not be forgotten, however, that showy flowers are not the only things about plants that interest us, and therefore the seeds of those species with remarkable forms of leaves or habits of growth will be desirable.

A new feature is injected into the discussion of what constitutes a weed, when we consider the different values accorded the same species in different parts of the world. Away up on the slopes of the Blue Mountains in Jamaica, where in January roses are in full bloom and strawberries are ripe, I saw them cultivating the common white or ox-eye daisy in the flower beds and was informed that it was necessary to give them considerable attention to keep them from dying out. Here a "weed" had turned to a "flower," but near by on the lawn the round and smiling countenance of the dandelion beamed as brightly as it ever does in more northern climes, and served to emphasize the elevation of its companion. By blooming where it was not wanted the dandelion was still a weed, proving conclusively that the definition of a weed as "a plant out of place" is the true one. And yet how small an accident sometimes saves a species from becoming "out of place." Numbers alone in the case of the dandelion make it a weed, for if there was only one dandelion-spangled lawn in all the world its owner would value it highly and people go long distances to see it. And is there a more showy and beautiful plant than the common toad flax? If it were not so common we should be cultivating it in our flower beds and borders along with highly prized exotics. Indeed, it is said that all the multitudes of this species that now threaten the farmer have sprung from ancestors cultivated in the flower garden. The musk mallow, the high cinquefoil (*Potentilla recta*), the dame's violet (*Hesperis matronalis*), and many another in the farmer's list of weeds have a similar origin, and have left the confines of the garden for the freer life of the fields, roadsides and river banks to the delight of all lovers of the beautiful and the disgust of none save the cultivator of the soil.

BOOKS AND WRITERS.

—"A Laboratory Manual of Elementary Biology," by Prof. F. D. Heald, will be issued in September.

—Lee & Shepard announce "Among Flowers and Trees With Poets," to be published in September.

—The publication of "Southern Wildflowers and Trees," illustrated by Mrs. Ellis Rowan, has been postponed until autumn.

—Wm. Briggs, Toronto, has recently issued "Sylvan Ontario; a Guide to the Native Trees and Shrubs," by W. H. Muldrew.

—The late Dr. Thomas C. Porter had for many years been preparing a complete flora of Pennsylvania, but died before it was printed. The manuscript was practically completed, however, and it is announced that it will eventually be issued under the editorship of Dr. John K. Small.

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MULLEIN AND POKE.

BY ERNEST WATERS VICKERS.

I cannot forego a little tribute to these lusty herbs in their season. The mullein is always conspicuous and interesting. It was reputed by the simplers of old with the power of soothing, and in the language of flowers means good nature. This herb had laid strong hold on my imagination ere I knew what meaning the books had crowned it with. I can scarcely tell why, but it is a rustic classic to my heart with its great hoary mat of earth-hugging leaves, vigorous and cheerful in latter autumn and even peering out from under the thawing snows of winter, where it suggests elements of unconquerable rugged strength. It is just the herb for stony and waste places and poor and neglected hill pastures. Put its tall, stiff wands among strewn stones, scatter about some sheep, with their weather-worn coats, suggesting the mottlings of the lichens on the rocks, to which they seem legged brothers, and you have provided the picturesque elements which should tempt any poet-artist of out-door scenes.

Then the mullein's ascending spire where the canary-lemon flowers by their upward progress mark the succession of summer days. It is a string of petals followed by a string of seeds on those stiff stems, as persistent and forward-pressing as the successive hours! This plant seems very near the earth, more earthly than many another, which makes us forget its origin in the daintiness of its position. Perhaps this is a hint at its charm; it is lowly, humble, homely, and therefore, as in certain rude farmers, we fairly see and smell the old Adamic man—bow down before a certain exalted lowliness. And in keeping has the lemon flower been given that balmy sweetness, which we must stoop to smell, smacking of plowed land, a genuine soily odor, as strangely fitting payment for its homely humility.

The winged shaft, with its single or three or more branched top, like a trinity of wax tapers, suggests a candelabrum. It is a simple and noble form, unique and worthy of the attention of art; a thing fit to be chiseled in stone or raised in a base of silver on a field of gold. Good nature—let us at least say when we behold it afield, that it shall be our armorial emblem.

Philip G. Hamerton in "The Sylvan Year," and we quote from so good a book with gladness, says: "Of all the plants that grow the mullien in its decay comes nearest to that most terrible form of human poverty, when the victim has still, to his misfortune, vitality enough for mere existence, yet not enough to make existence either decent or endurable. * * * Their misery is like that awful destitution that stands clothed in the last shreds and remnants of prosperity."

To appreciate this you must see a band of old mulliens on a December or January night clustered on a bare hill in a flying storm, by lantern light or obscure moonlight. They take all "the whips and scorns" of winter in an inflexible spirit of good nature, seeming in that still upright, though lifeless form, to retain some vitality. Nothing to relent or sorrow over if they could recall the past. Hundreds of thousands of seeds perfected and being scattered even now by every blast. They are grandly erect and unbroken in all their ruin, like a noble character which no mischance of time can overthrow.

The Poke likewise delights the fancy in every way, though antithetically. From the time its edible shoots push up into the midst of the genial joys of spring all through its enchanted unfoldings, till it gracefully hangs out its spreading sprays with their fruitful "honors thick upon them," it is worth attention. Its fine, smooth red stems, handsome leaves and loose original style of branching—which measure the successful feeding of its roots—is like an inverted chandelier with all its candles set in clusters. The very flowers and fruits, like the rest of the plant, take space in which to be individual and airy. All about it are the signs of a leisurely, rank looseness and steady aggression. It is a gross feeder, only attaining its peculiar protection in the richest spots, and I wonder what it would do if it had all the food it could use. Visions arise akin to that of Jack's bean-stalk experiences.

It is a watery and plethoric herb from its youth up, and when autumn comes, blushes like a very wine bibber, and being so watery, how quickly and utterly is its ruin under the frost. The mullien is an old Puritan squatter sedant on his barren hill, where he must wrestle his sustenance from the soil, whose constitution is of the rocks, geologic. But this poke-weed is the son of luxury, liveth in rich places and waxeth fat, but how quick is his decline and fall! Long ere winter has taken matters in hand it is bent and broken upon the earth as if it had been made of pasteboard—the very emblem of fast rising, transient success and complete irretrievable ruin. In his pride he was the very dandy of the woods; how grandly he bore those bloom-clusters, green fruits and ripe, on stem ends not hanging down as of pure indolence, but still languidly half-hanging, showing even then his internal debility. Behold how he lies, his stalks carmine no more, but bleached like yellow bones, broken like pipe stems—the largest and most ignoble vegetable wreck to be seen in all the woods.

OUR SOUTHERN CANES.

In the Southern States the bamboo tribe of grasses is represented by two tall species known as canes. These grow along streams and in other low grounds and form dense thickets known as canebrakes. In many of their habits they closely resemble the true bamboos, as will be seen from the following account taken from Dr. Mohr's "Plant Life of Alabama:"

"These two species, which resemble each other so closely in habit, differ greatly in their modes of reproduction, a subject of much interest of which but little is yet known and one which invites the attention of the investigator of the ecological relations of plants, and no less that of the agriculturalist, on account of the value of the canes as pasture plants. *Arundinaria tecta* (switch cane) rarely exceeds the height of 12 to 15 feet, and the slender culm branched from the base is seldom half an inch in thickness. Early in spring, apparently every three or four years, the paniculate flowers are produced on naked radial shoots scarcely exceeding 18 inches in height, while the tall flowerless canes are sent up every season from the long creeping rhizomes. *Arundinaria macrosperma* (large cane), from 15 to 30 feet high and frequently an inch and over in diameter, produces the panicles of its flowers in the axils of the branches at long and indefinite intervals of time. It is evident, therefore, that generations may pass by before the spectacle of such a canebrake in bloom is ever witnessed. For example, in the beginning of the summer of 1896, the inhabitants of Russell County were astonished suddenly to find the large canebrakes bending under the burden of their heavy nutritious grains, which attracted large numbers of birds and beasts. The farmers regarded this as an entirely new plant, and, finding their stock grow fat upon the seed, stored away quantities of it, not only for future feeding, but under the delusion that if sown it would constitute a crop of small grain equal in value to any previously grown. But in the light of experience it is to be presumed that a period of not less than forty to fifty years has to pass before the propagation of this plant by sexual reproduction takes place; with the maturity of the seed the vitality of the plant is exhausted and the cane decays. In the succeeding season, from the spontaneous stocking of the ground with an abundance of seed, a new crop springs up. The seedlings produce no branches during the first year. These simple sprouts, which are known as "mutton cane," are tender and sweet and afford the best of pasturage. They are particularly sought after by bears, which find the impenetrable density of the canebrake their securest retreats."

THE OX-EYE DAISY.

Like the English sparrow (*Passer domesticus*) and the cabbage butterfly (*Pieris rapae*) there has come to us from European shores, and probably earlier to that continent from Asia, a pretty weed called *Chrysanthemum Leucanthemum,* or in common parlance, the ox-eye daisy, the word daisy being the well-known corruption of the Anglo-Saxon daeges-eage, day's eye, which is of more than usual fitness, since at nightfall, or on the approach of stormy weather, the ring of white ray florets closes gently over the yellow eye, and the flower is fallen asleep.

A long list of other common local names has been applied to this much admired, much despised flower, among them being white-weed, dog-daisy, bull-daisy, butter-daisy, big-daisy, midsummer-daisy, moon-daisy, horse-daisy, poorland-daisy, or maudlin-daisy, dutch-morgan, moon-flower, moon-penny, great white ox-eye, poverty-weed, white-man's weed and herb Margaret.

It is commonly distributed over the northern and eastern United States, less abundantly toward the South and West; yet to the friend living in northern Ohio a New York daisy field proved a revelation of beauty never witnessed before.

The daisy has taken kindly to our soil, and has evidently come to stay. It does not ask for much; any waste place will do, and every year the whiteness grows till a veritable Milky Way has dropped from the sky. Beginning with May, it claims all months for its own into the fall season, but it especially loves the June days and the company of the buttercups and clover and swinging, blossoming grasses, and it then puts forth its best show.

Occasionally, unbidden, it nestles among the mowing fields, and the practical farmer is at once upon his guard. To him, a daisy is a worthless thing, exhaustive to the soil and suggestive of poor land. Though the stalk be lain low and the heads allowed to wither and die, the root remains, a perennial, and at least as many starry eyes look upward with the recurring seasons.

The small double English daisy, that grows only by cultivation in our lawns and gardens, was the "wee, modest, crimson-tipped flower" of the Scottish poet, the "gowan" of Scotland and the "bairnwort" of Yorkshire, and is most dear to English eyes, since, we are told, it is as the grass of the field in abundance. The Christmas and Michaelmas daisies are included as species of aster.—*From an article by Susy C. Fogg, in Nature Study.*

AERIAL RUNNERS IN THE STAR FLOWER.

Those acquainted with the star flower (*Trientalis*) and with its life under ground are familiar with its slender white tuberiferous runners one or two feet in length. It is of great interest in the dry days of late summer to lift off the deep covering of moss and disclose this outcome of the summer's work with the well-developed tuber already rooted in the ground. The protective bend of the bud is especially marked and at intervals along the runners are minute scales similar in nature to those more developed on the upright stem. As the white runners thread the moss a touch of rose-color here and there shows where they have run nearer to the surface and felt the influence of the sun. These traces of color suggest in a novel way the stem-nature of the underground runners.

Some years ago, in late summer, at Machias, Washington County, Maine, a few peculiar specimens of the *Trientalis* were found. From the axils of the leaf-like scales were produced slender aerial runners. They were of a deep carmine color, and an unusual coloring of the leaves suggested some injury or blight. These plants showed no sign of blossoms except in cases where blossoms had not perfected fruit. These aerial runners, as they dip into the moss, form tubers similar to the usual subterranean ones. Ordinary plants of *Trientalis* at this season show very long underground runners and well developed tubers, but these plants for some reason seem to have put their strength into these runners above ground. They have continued to hold their own in that one spot, changing only from the mossy base of one tree to that of another. This place is just on the border line where the "old growth" type of vegetation meets the tangle of a sunny second-growth.

Sometimes the graceful runners are swinging free, sometimes they have just penetrated the moss enough for the tuber to form. Last summer (1900) after the extreme drought I was unable to find a specimen in the old place for a long time, but one plant finally appeared with a well developed tuber and the same characteristics as in previous years. I was once attracted to what appeared to be a similar condition of growth in *Trientalis,* but it proved to be another interesting phase of life. A couple of these plants were growing on the moss covering of an old fence log. When the white underground runners reached the perpendicular end of the log and lost the covering of moss, they assumed the rich color of the aerial runners and swung out free over the edge instead of following out the root instinct and seeking the dark again. Here again the pink spots on the white runners showed at intervals the effect of the light.—*Robina Silsbee Smith in Rhodora.*

BAMBOO SEED AS FOOD.

"It would not appear to be very generally known," says a writer in the *Indian Forester,* "that the seed of the bamboo is not only fit for consumption by man, but that, in this corner of India, it is being collected and so consumed to an extent sufficient to ameliorate a very pronounced local scarcity. How far outside the Dharwar District the seeding is taking place I am unable to say. It undoubtedly extends some distance into Kanara. Here two taluqas are alone involved. In them it is rarely possible to meet with a single culm not undergoing the process. The approximate area may be stated at 75,000 acres, extending fifty miles from north to south, along belts three to eight miles broad. It is generally admitted in this area that but for this prolific seeding, owing to the great scantiness of the rainfall during the past two seasons, the poorer classes would have been hard pressed. The fact that there has been an unprecedented deficiency in the rainfall over a tract of country which is almost invariably well favored in this respect, leading in its turn to a sudden seeding of the bamboo, is significant and of interest; but with this aspect of the question I am not at present concerned, except in so far as to incidentally draw attention to the old Brahmin saying, 'When the bamboo produces sustenance we must look to Heaven for food.' The purely local inhabitants are not the only ones who are taking advantage of the present situation. The news has spread far and wide into territories where forests do not exist, and the influx of people represents a serious factor in the preservation of the reserves from fire. It is a common thing to see cart-loads of bamboo grain plying along our roads where but a short while back grain in any form was at a premium. When the seed is ripe, a very slight shaking of the already dry stems is sufficient to induce it to fall plentifully. The flour is either mixed with rice or 'jowari,' or eaten by itself, prepared into the ordinary flat cakes of the country, termed 'chapatis.' It has been found that two women can collect about eight pounds of the seed in the day, which, after the removal of the husk and bran, is reduced to six pounds. This quantity will make thirty cakes seven inches in diameter, or sufficient, it is said, to feed an able-bodied man for six days."

FERTILIZATION OF JASMINE FLOWERS.

It is remarkable that the most simple things are those one knows the least about. Everyone has seen the flowers of the Jasmine, but no one knows exactly how their fertilization is effected. Recent researches, however, have helped to throw more light on this interesting subject. Upon examining a flower of *Jasminum* one at once notices that the corolla tube is narrow, and that the anthers are disposed in such a way as to almost completely close the entrance, leaving a passage between themselves so small as to be hardly apparent. The flowers also are horizontal, and the pollen cannot fall upon the stigma; direct fertilization is therefore not possible. It is here that the intervention of insects becomes necessary—but to which must we turn? Many dipteras visit the flowers of the Jasmine, but their probosces are short, and they are not able to gather the nectar. It is the same with bees. One *Bombus hortorum,* in certain cases and by reason of the length of its proboscis, can obtain a little of the nectar that is secreted at the base of the corolla tube, but here there is another hindrance. This bee, for some reason or other, is not fond of Jasmine flowers, and it is only occasionally that it deigns to be attracted by them. The majority of the butterflies are hardly more useful; a beautiful little sphinx, however, bearing the name *Mactroglossa stellatarum* appears to accomplish the task conscientiously. From eight o'clock in the morning until eight o'clock in the evening one sees it in groups upon the flowers of Jasmine. So agile is it that it is capable of visiting fifty flowers a minute, and rarely goes to the same one twice. The proboscis, 28 millimetres long, permits of its reaching the nectar, but it can only obtain this latter by passing its proboscis through the narrow passage between the anthers. Pollen then naturally adheres to it, and this the obliging butterfly will unconsciously deposit upon the stigma of the same or another flower.—*Le Jardin.*

TREE LOBELIAS OF ABYSSINIA.—We are so accustomed to look on Lobelias as annuals, or at most as perennials, that it comes as a surprise to many to hear of tree lobelias: nevertheless, various arboreous species of the genus *Lobelia* constitute one of the most striking features in the vegetation of the open parts of some of the loftiest mountains of tropical Africa, where they grow at elevations of 6,000 to 14,000 feet. In habit they resemble a Cordyline or small Palm, having an unbranched stem, with a crown of undivided, pendulous leaves, finally surmounted by a terminal, erect inflorescence several feet in length.—*Gardener's Chronicle.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

USE FOR PRICKLY LETTUCE.—In sections where the prickly lettuce (*Lactuca scariola*) is becoming a nuisance, it may be welcome news that this plant is greedily eaten by poultry.

THE CURRENT NUMBER.—"Swindled again," said the old gentleman as he threw his paper down. "They advertised to send the current number for 25 cents and there ain't a word about currants in it."

THE SHAMROCK.—A recent number of *Leslie's Weekly* alludes to the shamrock as "the little *green blossom* dear to the heart of Ireland's sons and daughters." Evidently the editor is neither an Irishman nor a botanist.

THE AMIABLE (?) SCIENCE.—In view of the many differences that exist between the leaders of botany at present, it would seem that the individual who called botany "the amiable science" must have overlooked a most important prefix.

LITHOSPERMUM PILOSUM.—This beautiful plant inhabits the Alpine crags and peaks of the Sierra Nevada summits. It has singularly beautiful gray white foliage and grows flattened and depressed, no doubt caused by winter snows. Viewing this plant from a short distance it looks like a pile of ashes. It would make one of the greatest novelties out for scenic effect in landscape gardening.—*S. L. Watkins, Grizzly Flats, California.*

DATE PALM SUGAR.—The common date palm (*Phoenix dactylifera*) is found growing wild in nearly all parts of India. In Bengal the tree is utilized economically for the manufacture of sugar from its juice, and is a source of profit to the owners. This aspect of the date tree does not appear to have struck the people of the Central Provinces, Central India and the Deccan generally, where the tree is found growing in groves of thousands. Recently a joint stock company, called the Khandwa Sugar Manufacturing Company, has been launched to work this profit-yielding tree, and started work at Nimar three years ago. So far the results give promise of a bright future.

COMPASS-PLANTS.—A distinguished scientist explains that the prickly lettuce (*Lactuca scariola*) is a compass-plant by reason of "phytolytic movements of chloroplasts in exposed cells, paraphototropic reactions, and photeotic, or nyctitropic movements of leaves." If any other scientist can box this vegetable compass more concisely, it is his turn to speak.

MOONSEED POISONOUS.—*American Gardening* reports the death of three boys at Sharpsville, Pa., from eating the berries of the moonseed (*Menispermum Canadense*). The berries are similar in appearance to frost grapes and the boys ate a great many. In spite of promptly administered emetics they soon died in convulsions. The action of the drug is said to have been similar to that of strychnine. Moonseed is a relative of the well known drug plant, *Cocculus indicus,* which is also poisonous. Although moonseed berries resemble grapes, the ripe fruit is very unpalatable, which fact alone will doubtless prevent many occurrences of this nature.

ARMED PLANTS.—"It is often a matter of conjecture among visitors to botanical gardens and elsewhere that collections of tropical plants are grown, as to the reason for so many of them being armed with thorns, spikes, and prickles," says *Gardening World.* " It is now generally conceded that these members of the torrid zone have got to arm themselves thus against the eternal preying of the herbivorous animals. In some parts where vegetation is scarcer, and where the mammalia are hard pressed for food, the plants are found to be very strongly endowed with these spines. The thorns or prickles serve as protective armor for preserving the plants from extermination." The more one studies these thorny plants on their "native heath," however, the less inclined he is to attribute the presence of thorns and spines to the attacks of herbivorous mammals. It is a singular fact that the great tree-ferns of the Tropics are heavily armed with thorns, while the herbaceous species, which would be most likely to be eaten by browsing animals, are entirely unarmed.

PLANT PROTECTION.—Mr. Frank A. Suter, Lancaster, Pa., writes that the destruction of Dillerville Swamp, which is bound soon to occur, will result in the eradication of several interesting plants from the vicinity of Lancaster. Among these are the golden club (*Oronticum aquaticum*), fringed gentian, ladies' tresses, purple gerardia and *Smilicina stellata.* Mr. Suter asks how this flora can be preserved. He as well as many others will doubtless be interested in the Society for the Protection of Native Plants recently organized in Boston whose mission seems to be the answering of just such questions. This society intends to publish brief articles and leaflets pointing out what plants especially need protection and how they may be protected. Miss Maria E. Carter, Boston Society of Natural History, Berkeley Street, Boston, may be addressed for further information and leaflets. We shall be glad to assist the movement and offer space in our columns for notes upon the subject.

NATURE STUDY AND THE CHILD.—It is a fault with much of our nature study writing for children that we make too much of what we term the natural order in the development of plant and animal life. The idea is relatively so new, even to the oldest of us, it has appealed to us with such force, that we attempt to load down the child with it, and set him to dragging a chain in his walks afield. We prepare our text-books in the most orderly manner, and with a gravity which, under the circumstances, is half comical, beginning with man, perhaps, and going back through the long line of vertebrates to the sea squirts; or, we begin with the sea squirts, and climb painfully up to man again, expecting the boy to be profoundly impressed. But he is not. He is sure to disappoint us. Some day, bald-headed and with spectacles on, he may argue with other spectacled bald-heads, and maintain his ground, that, because a cross-vein in the wing of some insect arises from the principal at an angle of thirty degrees, instead of thirty-five, an entire group should be rearranged; but for the present, being a boy, he hates the thought of any kind of chain and the merest suggestion of order.

PUFF-BALLS WANTED.—The editor recently had the pleasure of meeting Mr. C. G. Lloyd, who is making a special study of our puff-balls. He is especially anxious to obtain collections of any species of these, except the very large ones, and will gladly pay the transportation charges on specimens sent him. The specimens do not need any special preparation—just carry them home without crushing, lay them aside to dry and then send them, packed so they will not be injured, to Mr. Lloyd, at Court and Plum Streets, Cincinnati. It is suggested that when specimens are plenty a pint of each kind be sent, especially if the species is a small one. While not pursuing this study for the number of new species to be got out of it, Mr. Lloyd is inclined to believe that there are several species in the United States still unknown, and every person who knows a puff-ball when he sees it can assist in settling the question. The best time to collect the specimens is just before they are ripe, but do not discard them even if fully ripe.

EDITORIAL.

The editor of this journal is spending the autumn months in New Orleans. If correspondents do not receive answers to their communications as promptly as usual this note will explain the delay.

We note with considerable amusement the solicitude for the success of this journal expressed in the July number of the *Plant World*. The editor of that publication has grave doubts of our finding favor with the public for a magazine like THE AMERICAN BOTANIST, which consists "of only sixteen pages of reading matter composed largely of extracts" and "without illustrations." It is quite probable that the editor of the *Plant World* is not alone in his opinions regarding such a journal and we therefore take the opportunity of setting forth somewhat more fully the policy of our magazine in order to lay further doubts at rest. In our opinion the number of pages has nothing to do with the case. It would be a queer reader that demanded a large number of pages quite irrespective of what was printed upon them. The value of the goods in small packages has passed into a proverb. We hold that sixteen pages of really interesting matter fully equals twenty-eight pages in which almost anything is used as "filler." Every line in our magazine is selected for its value to the general reader. We make no apologies for clipping from other journals since we are concerned solely in selecting matter of interest to the flower lover, and must take material when we find it. Indeed, this very feature relieves the reader who cares not for technical articles, from subscribing for numerous botanical journals. The pith of all valuable articles will be found in THE AMERICAN BOTANIST. We also hold that illustrations which do not illustrate are worse than none, since they take up space which might be devoted to reading matter. When any of our articles need illustrations, we shall not hesitate to use them. We disclaim all attempts to "popularize science" and reiterate that we publish this journal for the flower lover and *not* the scientist, although the contents of every issue will be found strictly in accord with the best science. The most satisfactory proof that THE AMERICAN BOTANIST is appreciated, however, is found in the fact that as this third issue goes to press, we have more subscribers on our list than the *Plant World* had at the end of its second year! This ought to be sufficient for our critics.

It is well known that the late Grant Allen was a naturalist long before he was a novelist; but he soon found that writing on natural history subjects did not pay financially, and turned his attention to more lucrative fields. Notwithstanding the change in his subject-matter he always had a fondness for the real natural history and a fine contempt for the hair-splitting scientist who works for glory rather than for love of his subject. His opinions upon this point are constantly cropping out even in his novels. In "The Tents of Shem," he makes one of his characters say: "There are two kinds of naturalists, you know. The superior class live in London or Paris, examine everything minutely with a big microscope, tack on inches of Greek nomenclature to an insignificant mite or bit of moss and split hairs against anybody with marvellous dexterity. That's science. It dwells in a museum. For my part I detest it. The inferior class live in Europe, Asia, Africa or America, as fate or fancy carries, and instead of looking at everything in a dried specimen, go out into the woods with rifle on shoulder or box in hand and observe the birds, the beasts and green things of the earth, as God made them, in their own natural and lovely surroundings. That's natural history, old-fashioned, simple, common-place natural history, and I for my part am an old-fashioned naturalist." This expresses the matter very nicely and will no doubt appeal to many who delight simply to wander among the flowers without a care for the long names by which the scientist knows them.

—A Laboratory Manual of Elementary Biology, by Prof. F. D. Heald, of Parson's College, is to be issued in September.

BOOKS AND WRITERS.

—Ginn & Co. have recently issued a valuable little book for young students of botany. It is by Prof. Geo. F. Atkinson, and is entitled "First Studies of Plant Life." The principal facts in the growth and behavior of plants is described in very attractive form.

—The United States Government has just issued a monumental work on the flora of Alabama, by Dr. Charles Mohr. It is entitled "Plant Life of Alabama," and covers more than nine hundred octavo pages, being one of the most elaborate of State Floras thus far issued. Besides a systematic catalogue of the plants of the State there is an interesting account of their distribution and adaptations. Nearly forty-five hundred species and varieties are listed, of which number a little more than half are flowering plants. Several new species are described. Dr. Mohr's death occurred but a short time before the appearance of his volume, which will remain a most worthy monument to his memory.

—As a general thing a "local flora," unless it be a mere list of names, is of greater interest to the botanizer than any botanical Manual. The author of the local flora usually has room here and there to insert observations on the habits and distribution of his plants and gives his work a living interest, while the Manual all too frequently smacks of dead plants and the herbarium. An unique and most interesting addition to the list of local floras has recently been made in the form of a 65-page pamphlet entitled "Sylvan Ontario," by W. H. Muldrew, published by William Briggs, Toronto. In addition to a list of the trees, shrubs and vines with notes, there is an excellent key to the species illustrated by 131 drawings of leaves and a very comprehensive glossary. This publication ought to do much to advance the study of the Canadian silva and will be of interest to all plant lovers of Eastern America. It is published at 50 cents.

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A LIVING COMPASS.

By Elma Iona Locke.

"Look at this vigorous plant that lifts its head from the meadows,
See how its leaves are turned to the north, as true as the magnet;
This is the compass-flower, that the finger of God has planted
Here in the houseless wild, to direct the traveler's journey
Over the sea-like, pathless, limitless waste of desert."

In the Botanies there are described about twenty varieties of the genus *Silphium;* the tallest, which may well be called a "vigorous plant," since it grows anywhere from three to twelve feet in height, is *Silphium laciniatum,* variously called compass plant, pilot plant, and rosin weed.

On the western prairies, where its use in former times may well be imagined, this plant is found growing in profusion. It was in 1842 that Major Alvord, of the United States army, wrote a description of it, but so strange a matter was for some time discredited by scientists. The various suppositions put forth by Major Alvord, in explanation of its singular behavior, being proved erroneous, it remained for Dr. Gray to discover the true explanation.

A large tuft of what one might describe as giant oak leaves rise from a root in size well proportioned to the plant, as one will find if he tries to dig it. These leaves are singularly constructed.

With most plants there is an upper and under surface to the leaves plainly indicated by their structure, but in the compass plant both sides of the leaf are alike, and both being equally sensitive to the light, in their evenly balanced struggle to gain the sunshine, they assume the position which has given the plant its name of compass, standing nearly upright and presenting their edges, not their tips, directly north and south.

The plant is a large, rather coarse looking perennial, with a rough, hairy surface and a resinous juice. The leaves are deeply lobed, or toothed, and in rich meadows sometimes grow from one and a half to two feet or more in length, and a foot or more broad. From this group of massive leaves rises the tall flower stalk with its yellow flowers, showing by their resemblance to its near relative, the sunflower, that this plant belongs to that immense family, the *Compositae.* Unlike the sunflower, the blossoms are small, but doubtless they increase in size under cultivation, as the florists are now offering the plant under the name of *Sylphium,* and recommending it highly as an ornamental plant with *large* flowers.

There are some erroneous ideas current regarding this plant. It has been imagined by some to be magnetic, and others appear to have the notion that its blossoms instead of the leaves are the parts that constitute the "compass." As to the uniformity with which it shows the points of the compass, a careful observer, after an examination of a large number of specimens, reported that one-third of them bore within half a point of north, and two-thirds within a point.

"Weeds are active enemies, not to be despised so much as hated. They are cut down or uprooted whenever found. So great a pest are they that man has taken them for a type of rank, rapid and useless growth. Yet, when curiosity leads us to observe them, we find beauty even in the meanest."—*W. W. Bailey.*

THE OCTOBER FLORA OF NEW ORLEANS.

By Willard N. Clute.

Here beside the Gulf on the border land of eternal Summer, Nature has not yet thought of putting an end to the blooming season. To be sure the seed pods of many species are now ornamenting flowerless branches, but other plants keep up a fine show and one realizes that Autumn is merely the name of a season and does not necessarily carry with it the idea of fading flowers, falling leaves and migrating birds. No sign that Autumn is here—that is, no sign that is perceptible to Northern eyes—is to be seen, save that given by the goldenrod. In the Northern States the goldenrod's race must now be nearly run; here it is just beginning but there is no promise of a wealth of gold to be lavished upon field and wood, as it is a thousand miles nearer the pole, nor is there an indication that the goldenrod will be followed by a long line of asters as at the North. There is one species of aster blooming here at present along neglected waysides—narrow leaved, slender rayed, pale colored, as if pining for its lusty kin in the Northland; but so far as I have observed this is the only one at all common. But why long for asters and goldenrods when the whole land is overrun with other flowers. The city shares with the country in floral riches. I do not remember ever to have seen elsewhere, roses in such profusion at this time of year. They bloom ungathered in the public squares, they clamber unchecked over the curious squatty houses of old French architecture and whole gardens of them usurp the lawns before more pretentious residences. I have been told that an armful may be bought at the florist's for ten cents. At any rate, here they are in abundance, filling the air with fragrance, especially in the cooler parts of the day.

With the roses grow many plants of more tropical appearance—clumps of bananas in full fruit, feathery grasses twice or thrice the height of a man, giant-leaved *Caladiums,* and palms and cycads in plenty. Along the better streets palms are frequently planted between the walk and roadway. As for the palmetto, there is no need of planting that, for it comes up of itself along fences and in waste grounds, while in the swamps and on the outskirts it forms extensive thickets and holds its dark green fans aloft as if they were of as much consequence as their more exclusive relatives of the gardens. Notwithstanding all I have said about the plants in cultivation it seems to me that a much greater variety could be grown with very little trouble. Although the climate is moist and warm, just meeting the requirements of the ferns, these plants are rarely seen. There is less than half a dozen native species in the vicinity, but many more from the Tropics could be made to grow here. The same might be said of palms and palm-like plants, but I desist for fear of being considered ungrateful for those that are present.

It strikes the casual observer as curious that a city beaten upon by the Summer sun so mercilessly, should not have more shade trees, especially along the streets. The china-berry tree nestles close to the low houses and spreads its protecting umbrella lovingly over the gray roofs, and here and there magnificent live oaks, draped in festoons of "gray moss" and bearing colonies of the resurrection fern (*Polypodium incanum*) stretch their long level branches across the way, but there are very few streets shaded by a continuous line of trees as Northern streets are. Probably the principal shade tree is the magnolia. Its dark glossy foliage and compact head is seen on every hand. At this season the crimson seeds peeping from the rough cones give a very pleasing appearance to the tree, as if it were blooming again in a different color. There are many trees in the South, such as the sween gum (*Liquidambar styraciflua*), cypress, mulberry and oak that seem admirably adapted for shade trees, but they are comparatively rare in cultivation. An occasional poplar, cedar and button-wood may also be seen. Large trees of any species except live oaks are quite rare.

Among shrubs the crape myrtle with flowers that look as if made of pink tissue paper is very common. Among shrubs also must be classed the fig "trees," which hang over almost every wall. They are loaded with small green figs at present, but these, I have been informed, do not come to maturity. The season for ripe figs has been past for some weeks and the trees are now dropping their leaves. Unless I class the castor oil plant (*Ricinus*) with the shrubs, I shall not know where to place it. The Northern housewife who so carefully cultivates a few starveling "castor oil beans" in her garden, would be both surprised and pleased to see the same species here, taking on the form and size of a tree and luxuriating in untrammeled freedom on rubbish heaps and in other wastes. In spots where it is cared for, it forms a trunk several inches thick and carries its crown fifteen or twenty feet skyward. Recently much has been written concerning the utility of the castor oil bean in driving away mosquitos. However valuable it may be in other parts of the world. its virtues seem to be lost here. Mosquitos are "too numerous to mention"—without strong language—and all the inhabitants sleep under mosquito bars.

Our familiar friend, the elder, is another plant that attains unusual proportions. Here it is really a tree and bears its clusters of berries far out of reach. I have never seen the European elder tree, but imagine this must be somewhat like it. Along with the berries which are just ripening one sees quantities of the creamy blossoms. This second blooming is said to be due to freakishness upon the part of individual plants, but it appears to me to be so general that I question whether it may not be possible that the plant is trying to develop two blooming seasons a year.

Although we are well within the limits of the orange belt, few of these trees are to be seen. Their place is taken to some extent by the persimmon, of which several improved kinds are grown here. The first of these have been ripe for some time, and notwithstanding the fact that there has been no frost, are as mild and agreeable to the taste as one could wish.

Leaving the city for the country, one finds many blossoms to interest him. Chief in my estimation is the passion flower (*Passiflora incarnata*) which clambers over the low bushes and continues to hang out its large purple and white flowers. The fruit is a small melon-like affair and is known as a maypop to the few who are interested in such matters. I have not yet had an opportunity of tasting it, but if the flavor should approach that of its relative further South, the grenadilla, I should consider it worth going some distance to get.

This part of the world is so low, and the soil is so little above the point of saturation, that in many places one must keep pretty close to the road or railway while botanizing. As a result of this moisture the plant covering consists principally of swamp-loving species. The cypress is most abundant and shares with the live oak the honor of being the host of the gray moss. In open places the ubiquitous cat-tail rears its well-known spikes, while here and there a gigantic species of arrow-head (*Sagittaria*) with spoon-shaped leaves appears. Another familiar species, the button-bush (*Cephalanthus occidentalis*) is plentiful, and, what impresses me as curious, is just coming into bloom. Certainly the same species does not bloom with the late goldenrods at the North; then why should it do so here? The question remains unanswered.

Where the button-bushes abound, one usually finds the climbing boneset (*Mikania scandens*) festooning the branches. This is by right a Southern plant, but having first seen it in the Long Island and New Jersey swamps, I can hardly fit it into this scene as being a native. In drier places, as along roadsides, the purple clusters of the iron weed (*Vernonia*) light up the green.

After traveling with this plant showing in the landscape almost constantly for more than a thousand miles in many soils and at many altitudes, I cannot help thinking that it is most appropriately named. Common as it is, it is a beautiful plant and one well worth cultivating in parts of the country where it has not found a place for itself.

If one pushes into the wilderness in any direction hereabouts he is likely to soon come upon a lagoon or bayou of dark and slow-moving or stagnant water. And almost certainly the surface will be covered with the fat and thrifty plants of water hyacinth. It is difficult to realize that all their bulk has been taken from the water and the air. Here they float in the bright sunshine, and send up their strong spikes of hyacinthine color. The people call them water-lilies and they are handsome enough to deserve the name. Albeit, the waterman considers them one of the greatest pests; but those who have no desire to thread the devious ways of the sluggish waters,—poets, artists and botanists,—may well pause here on the banks for a second glance of interest and admiration.

PITCHER PLANT AND BUTTERWORT.

By Mrs. G. T. Drennan.

Sarracena flava, the "sulphur colored pitcher plant," in local nomenclature, grows in profusion along the Gulf coast, and is one of our most interesting plants. The flowers are at least three inches across, of silky texture and of the clearest light yellow tint. They bloom with the greatest freedom, brightening the grass, the moss or the fallen pine needles like sunshine. The country people call—or rather mis-call—the flowers "buttercups," though they in no wise resemble the true buttercups.

There are "Butterworts" also growing among the pitcher plants, and blooming at the same time, contrasting, as well as blending harmoniously in yellow of richer, deeper tint. This bright yellow blossom is *Pinguicula lutea.* So striking is it in color and form that many admirers declare it is seldom equaled in nature. Each flower nods at the summit of a slender stalk rising from a rosette of leaves, flat upon the earth. They are irregular in shape, and each is furnished with a long spur at the base. These two lovely wild flowers are easily cultivated. Like ferns they grow in shade, moisture and spongy leaf mold. Transplant the soil of the woods along with the flowers, and locate their new quarters in partial shade, where it is cool and moist, and the tulips and hyacinths of spring must look to their laurels.

FLOWERS THAT ARE LUMINOUS.

There are few subjects more curious, and none, perhaps, less understood, than the occasional luminosity of certain plants and animals. We do not allude to that phosphorescence which arises from decomposing substances, and which every one must have observed on putrid fish, decaying fungi, and the like; but to those luminous appearances exhibited under peculiar conditions by living structures; as, for example, by the flowers of the marigold, and by the female firefly. The former phenomena are owing to an actual combustion of phosphoric matter in the atmosphere, precisely similar to that which takes place when we rub a stick of phosphorus on the walls of a dark chamber; the latter belong to peculiar states of growth and excitement, and seem at times to be ascribable to electricity, at others to phosphorescence, and not unfrequently to plain optical principles. It must be admitted, however, that not only are the causes but little understood, but that even the appearances themselves are questioned by many, who would resolve the majority of instances on record into more visual delusions. It is, therefore, to little more than a recital of the better authenticated facts that we can as yet direct attention.

Flowers of an orange color, as the marigold and nasturtium, occasionally present a luminous appearance on still, warm even-

ings; this light being either in the form of faint electric sparks, or steadier, like the phosphorescence of the glow-worm. The tuberose has also been observed on sultry evenings, after thunder when the air was highly charged with electric fluid, to emit small scintillations, in great abundance, from such of its flowers as were fading. It is not always the flowers which produce the light, as appears from the following record: "In the garden of the Duke of Buckingham at Stowe, during a storm of thunder and lightning, accompanied by heavy rain, the *leaves* of the flower called *Oenothera macrocarpa,* a bed of which was in the garden immediately opposite the windows of the Manuscript Library, were observed to be brilliantly illuminated by phosphoric light. During the intervals of the flashes of lightning the night was exceedingly dark, and nothing else could be distinguished in the gloom except the bright light upon the leaves of these flowers. The luminous appearance continued uninterruptedly for a considerable length of time, but did not appear to resemble any electric effect."
—*Indian Gardening.*

CULTIVATION OF OUR NATIVE PLANTS.

I am sure I have derived more pleasure from "herbaceous plants" than from any other. The herbaceous plants of our woods and fields are in great variety, and, although there are many most beautiful kinds almost exterminated, speaking of the vicinity of this city (Philadelphia), yet there are hundreds of sorts yet to be found, the looking for and the finding names of which would afford great gratification.

It is so common to hear persons say, when viewing some woodland beauty, "How I would like to transplant it to my garden!" While it is true that but few succeed in getting such plants to flourish in their gardens, it is nearly always from lack of knowing how to make them feel at home. Let me mention the Trailing Arbutus, *Epigaea repens,* as an illustration. It is the common belief that this lovely flower cannot be transplanted, and more than once I have corrected writers who have asserted this in public print. I have transplanted it successfully—so have many others. Six summers ago, when in England, I saw a nice patch of it in the Bagshot Nurseries; and many other large nursery firms there offer it for sale. It is not a native there, so that it follows that at some time or other the plants were safely transported from here, seedlings of it being rare. This plant likes shade and moisture and to be undisturbed. It would not thrive in the open garden, but if small, bushy plants with a good ball of earth be taken and set in a woodland where the required conditions exist, they will live and flourish.

With native plants, a little care should be taken to provide for them situations as alike as possible to those they have been accustomed to. There are shade-loving plants and those that have grown in open places. It often happens that a partly shady border is at command, where those that demand it can be placed. It does not always follow that a wild plant is found growing in the best possible place for it. Take, for example, the Scarlet Columbine, found on damp rocks along the Wissahikon (Philadelphia). I have seen better specimens of it in open places in gardens than ever I have seen wild, no doubt because the garden afforded better food than its native rocks did.

To those who have not tried it, it would be a great surprise to find how much better plants grow when the ground about them is well mulched. It makes the plants feel more nearly at home than anything else that could be done, save the giving of shade to some of them. Plants in the woods have shade above them and decaying leaves about them, and those in fields have grass or other plants about them, so that in both places the roots are cool. This is what mulching of the garden plant does, this and the preservation of moisture. Another thing rarely thought of is this. The wild plants in the woods are so covered with forest leaves that frost does not get to their roots. I am sure that all plants, hardy or not, are the better for this; and I would mulch afresh in the fall, that the roots may have a winter covering. As herbaceous plants will repay good food given them, I would mulch with manure in the fall. Let it be long manure, the better to protect the plants; the strawy portion can be raked off in the spring; the remainder can be left undisturbed. It will be loose, and often it will be sufficient mulching for the surface.—*Meehans' Monthly.*

FAIRY RINGS FORMED BY THE FLOWERING FERNS.

Mr. T. C. Buchheister recently called my attention to the fact that the various species of flowering fern (*Osmunda*) not only produce their fronds in circular crowns, but that the different plants are themselves arranged in larger circles. In a recent trip of several miles through a country where these ferns grow in abundance, I improved the opportunity to put this matter to the test and was surprised to find that the plants are rarely disposed in any other form where the conditions permit them to develop naturally. Walking into a thicket of the plumy fronds, one finds himself surrounded by a fairly regular circle of the plants. So here we have another form of the "fairy ring," if it is permissible to associate such tall and sturdy plants with the fairies.

Dr. Robinson, in *Rhodora,* has noted similar fairy rings in *Lycopodium inundatum* and explains them upon the supposition that the different plants move outward from the centre in search of fresh soil and new food supplies, and so eventually form the circles. This explanation, owing to the way in which the ferns grow, would seem scarcely to answer for the *Osmunda* circles. It is more likely that each is the progeny of a single plant which has given off branches from time to time, all of which moved outward from the place of origin. It was noted that a line through the plants in a clump made an oval rather than circular figure, and it is conjectured that the original plant started at the broad end of this oval and grew along the major axis directly across the centre of the figure. If this be the correct solution, one has only to consider how very slowly the *Osmundas* move onward each year to realize the great age of a large ring. A hundred years is a very low estimate of the time needed to form one.—*Fern Bulletin.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

THE DWARF MISTLETOE.—A writer in the *Plant World* notes that the dwarf mistletoe (*Razoumoufskya pusilla*) is still but imperfectly known. The botanies name June as the time at which it blooms, but last spring it was found blooming in late April in the Adirondack Mountains, of New York. Recent explorations have shown that this plant is frequently very abundant in forests of black spruce.

NATURE AND SCIENCE.—"In this age of science let it be remembered that the objects of nature may be viewed in a poetic aspect as well as in a scientific. Asters, willows, butterflies and sparrows serve just as high a purpose when we think of them as symbols as when we study them analytically. Roses exist as much for the purpose of suggesting love, sweetness, youth and purity as for the study of calyx and petals and stamens."—*Among Flowers and Trees With the Poets.*

PINK BLUEBERRIES.—Last August while botanizing near Mt. Pocono, Pennsylvania, Dr. A. A. Angell found a large patch of blueberries which instead of the usual blueberries bore fruit of a bright pink color. This fruit was perfectly ripe and showed no tendency to ever assume what should be its natural hue. Some specimens sent to me prove the species to be the common dwarf blueberry (*Vaccinium Pennsylvanicum*). Since a rather extended search in the Manuals give no hint that pink berries have been observed in this species, and since this form is better handled by giving it a name, Dr. Angell suggests that it be called *Vaccinium Pennsylvanicum forma rubrum*. In all respects, except color, the form is like the species.—*Willard N. Clute.*

EFFECT OF ENVIRONMENT ON TREES.—There is considerable evidence in the acclimatization of trees that the power of environment is very great. A moment's consideration of the powerful influence of a temperate climate on the phases of vegetation is alone sufficient. There are instances which seem to point to the possibility of a new periodicity, without the loss of the old one, being produced by a change of climate. One case of more than usual interest is given where the behavior of *Acacia dealbata,* indigenous to New South Wales, Victoria and Tasmania, has been entirely changed by the climate in the Nilgiris. The facts are, that in 1845 and up to about 1850 the trees in the Nilgiris flowered in October, which corresponded with the Australian time, but about 1860 they were observed to flower in September; in 1870 they flowered in August; in 1878 in July; and in 1882 they began to flower in June, this being the spring month in the Nilgiris, corresponding with October in Australia. It therefore takes nearly 40 years to regain its habit of flowering in the spring, *i.e.,* to become perfectly acclimated. I am also informed that the English oaks now growing at Johannesburg further illustrate this point, since they begin to drop their leaves towards the end of May, remain bare until near the end of August, when new leaf appears, to be followed by flowers which ripen into fruit by Christmas.—*Indian Gardening and Planting.*

EDITORIAL.

There is nothing so worthy of imitation as a good example. In July the *Plant World* inveighed against the use of borrowed articles in the AMERICAN BOTANIST, and in August it calmly runs an extract from *Harper's Magazine* as its leading article. Our contemporary is showing a commendable spirit of emulation.

During the publication of this magazine the editor has been obliged to decline with thanks, many articles that would no doubt have been eagerly accepted by other publications, and depend for suitable material upon the good offices of the mucilage bottle and a pair of shears. Lest it may be thought that original articles are not wanted, we hasten to say that those declined were so disposed of because of their kind and not their quality. We know that in declining these articles we have been an exception among publishers, but we are trying to make this an exceptional magazine. It is perhaps impossible to give directions for writing exactly the kind of articles we want, but we give herewith a few suggestions which may assist those who are trying to reach our mark. First and foremost, then, avoid the categorical style. Just as soon as you fall to enumerating a list of species your article will run dry. Not long ago a popular botanical magazine contained an article with seventeen lines of solid italic, this italic being the names of species. How could they interest the public? It is needless to say that we have no desire for such matter. It is well, also, to drop careful descriptions of stem, leaf and flower unless these are essential to a proper comprehension of the ideas you are trying to convey. What is it in the writings of other writers that has interested you? Is it not what may be called the personal interest, the thoughts and fancies with which certain plants have impressed them? The case is something like that of the honey-bee. In the chalices of certain flowers the nectar lies and she must gather it with infinite labor; but it is not until she has got it home and transformed it within her own body that she produces the wonderful substance known as honey. So with the writer. He may laboriously gather his facts, but it is not until he has transformed them in his head, worked them over in his mind, will the result flow forth as sweet and wholesome literature. The principal interest of a walk afield is not in plants or birds or beasts as mere objects of natural history, but in the various ways in which these objects minister to our five senses. Music, color, fragrance, gracefulness, the thousand charms that appear in the surroundings of the principal object and the fancies, incidents and associations that they recall—these are the things that interest, and these are the things that should creep into your writings. Suppose you were to try to tell a friend, who had never seen it, just how lovely and beautiful your own part of the world is; would you begin by giving him botanical descriptions? Not a word! Then do not give your friend, the public, different treatment. Botanical detail is all right in its place, but its place is not a popular article. As to the subject matter, the facts you use may not be new, but if clothed in new language may be formed into something that is new. At the same time, it must be said that a new fact, or a new idea suggested by an old fact, is by far the best material with which to begin your labors. Having found your subject, use plain language, which need not be confused with commonplace language, and may success attend you! It is not given to all of us to achieve this end, but none are debarred from making the attempt.

BOOK NEWS.

—Some of the literary journals are commenting with surprise upon the fact that the support that takes the form of orders in advance of publication, has been extremely small in the South for the new book "Southern Wildflowers and Trees." Nearly all the advance orders have come from Northern booksellers. The reason for this is assumed to be that the people of the Northern States are most likely to need such a book and to buy it to carry with it during trips to the South. To us, however, the real reason seems to be in another direction. It is well known that the people of the South do not take kindly to botany and the allied sciences and the publishers of most scientific journals can testify to the rarity of subscribers south of Virginia and Ohio. In a land where nature has done her utmost for the botanist, it is surprising to find so few devoted to the study of plants. The botanists of the South can almost be counted upon one's fingers. Whether this condition is due to the climate, the lack of time or the lack of proper facilities for study among the people is a subject worthy further investigation.

—The production of poetry relating to nature has kept pace with the prose matter upon the same subject, but being printed in various books of verse and in the larger magazines rather than in the scientific journals much of it has escaped the notice of the flower lover. It is therefore with much satisfaction that we note the appearance of "Among Flowers and Trees With the Poets," a compilation of such verse, by Wait and Leonard. It is especially strong in recent verse and will save the lover of the poetry of flowers much laborious search in the periodicals. At the same time the best of the poems by older poets are included. The matter is arranged under six heads: Flowers in general, flowers specified, trees and shrubs in general, trees and shrubs specified, flowerless plants and national flowers. There are also two appendixes relating to floral symbolism and flowers of the months. The verses under each head are arranged alphabetically, which further adds to the utility of the work. The authors appear to have been very successful in their task of compilation and one is surprised at the number of poems concerning different species. The rose, violet and lily no longer receive all the homage of the verse-makers. The book contains 415 pages, is tastefully bound in blue and gold and is published by Lee & Shepard, Boston.

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THE INDIAN PIPE.

By ERNEST WATERS VICKERS.

In one of my October strolls while filling my pockets with nuts and my heart with the glories which flee so speedily away, I came upon three little brothers of the spectral pipe. Not since my walks in the August woods on pilgrimages to a certain bank of ferns in an opening where the gorgeous plume of a purple-fringed orchid formed the shrine, had I seen this interesting flower.

This is the pow-wow pipe of my vocabulary—of purest, waxiest white, with a feeble salmon fire in the bowl. Pow-wow pipe rather as if nature had in mind the vanishing of the Red man when she placed this as a memorial in her wild garden. If any plant seems the product of enchantment it is this. At first glance it strikes the beholder as a fungus which has the gift of bloom. What experiences has it passed through that it should be turned gray, or what has it seen in the dark watches of the night that its chlorophyll should run white in its veins?

The witches of old Salem must have known and fondled it out on the needle carpets of the hemlock and pine shadowed woods, and I think it must have been in Hawthorne's enchanted forests where little Pearl played by the brook. It was born and bred in shadows deep where no health-giving, life-getting sunbeams fell. Yet it has a strange secret or retained sort of pleasant odor saved from better days, as though it had struggled to be a perfect flower and not this abortive uncanny thing. Circumstances were too much for it; but it is to be loved for what it is, a perfect, living flower modeled in wax by nature's own hand, and so delicate that after a few days it withers away in blackness.

I sometimes wonder what European folk-lore would have done with my pow-wow pipe had it smouldered in her realm. Someone has proposed the name "Pipe of Henry Hudson's crew" for it. Dead man's finger and corpse plant are unfit names for it and seem to have been given to it by those utterly devoid of fancy or reason.

SOME ABNORMAL FLOWERS.

By J. L. Sheldon.

Several specimens of roses were brought into the laboratory last spring as curiosities, on account of the abnormal development of the flowers. It was learned afterwards that they were rather common on a few bushes about town. Instead of the usual manner of blossoming, a second bud grew up out of the center of the flowers and finally opened like the first. The second flower was complete, as far as calyx and petals were concerned. A shoot is sometimes produced from the center of a flower instead of a bud, and instances might be mentioned where a bunch of flowers were also produced at the end of the shoot.

The "twinning" of peaches was also very common the past year. In some cases scarcely a single peach could be found on some trees, and as many as three or four were often found grown together, usually only one ripened, however, the extra ones "blasting" and falling off.

In an English work by Masters, which is becoming rare, there are good illustrations and descriptions of the abnormal development of the various parts of plants. One who is interested in this sort of thing can usually find plenty of examples without much trouble. The common double china pinks often show a succession of two or more blossoms in the same calyx. One blossom has hardly passed by before another crowds into its place.

Two bunches of blossoms are sometimes produced on the horseshoe geraniums, the one growing out of the other.

While abnormalities are of no special scientific value, they attract the attention of almost every one on account of their oddness.

Lincoln, Nebraska.

THE GRAPE FRUIT.

By Willard N. Clute.

Although the grape fruit is still comparatively unknown outside of the larger cities and towns, it is apparently rapidly increasing in favor with the American people. Last year the Island of Jamaica alone sent nearly thirty thousand dollars' worth of this fruit to our markets. In its season grape fruit may now be obtained at almost any large fruit store.

Notwithstanding its name this fruit in no way resembles the grape. One authority has it that the name is derived "from the size and shape of the globules containing the pulp," but since the interior construction of the grape fruit is exactly like that of the orange, this derivation seems scarcely likely. Americans seem generally to think that the name is given because of the flavor of the fruit, although this has but a faint resemblance to that of any grape with which I am acquainted.

The grape fruit is a member of the orange family, being regarded as a variety of the pomelo or shaddock (*Citrus decumana*). There seems to be some question as to which variety is the real *citrus decumana.* There is a noticeable difference in shape; the grape fruit appearing like a very large, light-colored orange, while the shaddock is still larger and pear-shaped, with a thicker rind and coarser grain. In fruit the shaddock is an interesting sight. If one can imagine a medium sized apple tree hung with pear-shaped fruit as large as small melons he will have a very good idea of what it is like.

In the United States the grape fruit is usually prepared for the table by removing both the outer rind and the paper membrane surrounding the sections of pulp. This membrane usually has a bitter flavor not acceptable to most palates. In the home of the grape fruit they treat the fruit in a different way. It is first cut in half across the sections, or "pegs" as they are called, then the centre where the sections come together is cut away and some sugar put in the cavity, the pulp is next loosened from the sections with a fork and finally it is conveyed to the mouth with a spoon. In this way one gets the full flavor of the fruit and at the same time avoids the bitter taste of the other parts.

THE RINGS OF TREES.

Every tree has its life history securely locked up in its heart. Each year of its growth a thin ring of wood is formed next to the bark and a corresponding layer of bark adjoining it. As the tree swells and swells the bark is forced outward and splits into wide fissures. Much of it falls off altogether, but each ring of wood remains a faithful record of the year in which it was formed. When the axe or saw of the woodman ends the life of the tree and brings its body crashing to the earth this record is unrolled before us, and by it we can determine almost every incident in the life and growth of the tree.

Trees as well as human beings have their period of struggle and hardship, their prosperous times, their terrible misfortunes and hairbreadth escapes, their injuries, and recoveries; their complete submergence in a struggle in which the odds were too great for their feeble strength to cope with.

Here is a sturdy oak, whose tale revealed is that of steady perserverance in the face of difficulties—a slow, gradual growth, never checked, never daunted, till the final goal is reached and it stands supreme, literally monarch of all it surveys.

Here is a mighty spruce which has a tale of perseverance, but of a different sort. The oak conquers by force of character, by its fighting qualities. The spruce succeeds by its ability to endure. It is like the patient Jew, frugal living on what would be starvation to others, till when their day of strength is past, and sudden disaster overtakes them, he enters into his inheritance and prospers amazingly.

See the record of this spruce—fifty, sixty, seventy years, each represented by a ring so small that it takes great care to distinguish them at all, and the whole seventy do not occupy the space of three inches at the heart of the tree. What a tale of hardship this sets forth. Other trees have pre-empted the light in which the existence of a tree depends. The poor spruce must be content with the twilight that filters through the branches of its enemies, the poplar, birch and pine. But it is content. It knows that the young poplars or pine spring up beside it in the shade they could not endure, but would quickly die. It knows that the time will come when old age or disease will weaken the poplars or perhaps a heavy wind will lay them low, and the spruce, old in years but insignificant in stature, will escape injury, and still young in vitality, will soon spring ahead in the race. Now see its rings—it has made as much growth in ten years as in the preceding seventy, and soon becomes a large tree.

What does the stump of this old white pine teach us? Evidently something extraordinary has happened to it, for way in near the heart a black scar runs around the edge of one of the annual rings for nearly one-fourth of its circumference, and outside of this the rings are no longer complete, but have their edges turned in against the face of this scar. Each subsequent ring reaches further across it. By the time they have met in the centre many years have elapsed and there is a deep fissure where the scar once existed. But the later rings have bridged the gap and, growing thicker in the depression, soon fill up the circumference of the tree to its natural roundness, leaving no sign of the old wood. What happened to the tree? While it was still young its mortal enemy, the forest fire, swept through the woods, destroying most of its companions and burning a large strip of the tender bark on its exposed side so that the bark died and fell off. But being better protected than the other and having still three-fourths of its bark left uninjured, it soon recovered and its stump reveals how successfully it strove to heal the wood and grow to maturity to perpetuate its species.—*American Gardening.*

COCOA AND CHOCOLATE.

In Trinidad little is known about the preparation of the article known as "Cocoa" as sold upon the English market. The word "Cocoa" is a corruption of the Spanish word "Cacao," and had its origin in European markets. It is used to denote preparations of the Cacao bean in powder, sweetened or unsweetened as "Cadbury's Cocoa," "Rowntrees' Cocoa," "Vi-Cocoa," etc., etc. Such powders are seldom prepared in the countries where Cacao grows, the article known as chocolate being almost exclusively used in preference, except by Europeans who have become accustomed to the preparations of their own countries, for whom a certain quantity is imported. In Trinidad a considerable quantity of "chocolate" is made for local consumption. The word "chocolate" is said to be of Mexican origin, and covers preparations from the Cacao bean which solidify on cooling into cakes or bricks or other moulded forms.

We have, therefore, two names which cover preparations made from Cacao beans, produced by the tree known as *Theobroma Cacao L.*

Chocolate is made from the Cacao bean roasted and ground to a paste, which hardens on cooling. This may be made sweetened, or unsweetened, and as much as 40 to 60 per cent. of sugar is added when made into confectionery, but less when intended to be used for making a beverage. The paste may be made either by hand on a flat piece of freestone, or it may be ground in mills constructed for the purpose. The chief hardening ingredient is the fatty matter the beans contain, known as cacao fat and used largely *in* medical dispensaries. *Cocoa* is the name given to a product of the Cacao bean, the preparation of which is commenced in the same way as the manufacture of chocolate; in fact, cocoa is nothing more and nothing less than "chocolate" with the cacao fat taken out, which prevents its solidifying into cakes.

All operations in connection with Cacao preparations have to be carried out at a temperature not less than 85 degrees Fahr. to keep the fat melted. Even at this temperature the fat will harden, but the manipulation generally increases the temperature sufficiently to keep the fat fluid. When the roasted bean has been ground into a fine fluid pasty mass, the fat may be taken out by placing it in thin layers in linen cloths, and placing these in tiers in a suitable press. For this work it is better that the temperature should be as high as 90 degrees Fahr. or over, as the melted fat will flow the more freely. The fat comes away readily, but contains Cacao red, the coloring matter of the bean, and some small portions of the solid matters of the paste. If the fat be at once filtered through animal charcoal in a water oven, it will on cooling be perfectly white and clean. The residue which remains behind in the cloths—or the "press cakes"—should now be removed. These are easily broken under slight pressure and may be rubbed through a fine gauze sieve, the resultant powder being the "Cocoa Powder" of commerce.—*Bulletin of the Trinidad Botanical Department.*

DOUBLE FLOWERS.

It is still a mystery as to what is the immediate influence upon plants which causes flowers to become "double." The commonest case is to have a substitution of petals for stamens and carpels, coupled with a multiplication of the number. Thus a stock ought to have only four petals, six stamens, and two carpels, but there may be more than fifty petals in a double flower.

Various kinds of doubling may occur. It may begin and end in the bracts, as in the wheat-eared carnation, the flowers of which consist of nothing but a constant repetition of the opposite pairs of bracts at the base of the calyx. A calyx may be repeated over and over again, the corolla being entirely suppressed. This has occurred in several plants, as larkspur, foxglove, veronicas, etc. With regard to the corolla, a second and a third may be formed one within the other, as in campanulas. In these stamens and pistil may remain unchanged.

When stamens are about to become "petaloid," the anther may have one cell in the form of a flat little petal. Though there is no real explanation of its occurrence, it may clear our notions to try and express what takes place somewhat as follows. Nature has divided the vital energies of a plant into several departments, and different supplies of energy have been, as it were, told off to undertake certain duties. Thus "vegetative" energy makes leaves. Other energies make sepals, petals, stamens, and carpels respectively; but from some unknown causes, they may invade one another's departments. Hence occurs a struggle in the structure of an organ under two different energies. All we can say is that to produce this, it is due to some "affection" we cannot account for; but it is apparently caused by some external influence from the soil or elsewhere. As an interesting example, when Mr. Heal was raising new greenhouse rhododendrons for Messrs. Veitch, he noticed a hybrid with anther petaloid on a truss of flowers. He pollinated that flower with pollen from its own stamens. The result was fifteen seedlings, and all were double or semi-double; from this origin arose the "Balsamifloral" section of the East Indian rhododendrons. The "affection" thus started proved, therefore, to be hereditary.

"Doubling," to which several series of parts of the same kind occur in successive whorls or continuous spirals, must not be confounded with a multiplication in the number of parts in each whorl. This often occurs, as in a corymb of elder flowers, among which flowers in "sixes" may often be found as well as the normal ones in "fives," just as a Crocus or Daffodil may be in fours, and orchids often in twos. In increasing the number, we assume hypertrophy to be the cause, just as atrophy probably accounts for the decrease.—*The Garden.*

WHY DEAD NETTLE.

One of the commonest plants in English hedgerows is the stinging nettle, and pedestrians are constantly striking their hands against the irritating weed to their cost. Anent this fact, I received while in England last summer a lesson in the origin of common plant names. A country boy with whom I was one day in company, was asked the name of a certain plant in the hedge. It looked like a nettle, and a nettle he replied. Being told to touch it and see, he very naturally declined, but on further urging, he finally fingered the leaves, at first very gingerly and then more firmly, and to his surprise received no hurt. Then it was explained that this plant was not a nettle, but quite a different weed (*Lamium album*) which looks almost exactly like it and grows frequently side by side with it, but because this has no stings, the name of dead nettle has been given it.—*C. F. Saunders.*

THE COLUMBINE VISITORS.

In the *Botanical Gazette* for October, J. Schneck has the following regarding the insect visitors of our common wild columbine (*Aquilegia Canadensis*) and the garden species most frequent in cultivation: "The form and distribution of the spurs is quite different in the two species. In *A. Canadensis* the spurs are straight, while in *A. vulgaris* the outer end is curved inward until it is again bent back on itself, forming an entire ring or circle. In *A. Canadensis* the spurs are longer and more slender and the tissues more tender. In both the nectary is located in the outer end of the spur, where it is represented by a hard nodule or gland. The common ruby-throated humming bird (*Trochilus colubris*) the *tobacco and tomato sphinx moths* (*Macrosila Carolina* and *M. 5-maculata*) are common visitors to *A. Canadensis,* but I have never seen them visit *A. vulgaris.* They take nectar by inserting the bill or tongue into the hollow of the spur while the flower is still hanging in the inverted position. * * * In both species, the Virginia carpenter bee (*Xyocopa Virginica*) and a small bee (*Odyncrus foraminatus*) slit the tube of the spur and take the nectar direct from the gland. Later the honey bee (*Apis mellifica*) and a green bee (*Agapostemon radiatus*) enter these slits and secure the remaining nectar, but they do not make new slits for themselves."

THE BITTERSWEET.

An unkempt country lane in autumn is one of the most picturesque of sights, and offers much entertainment to one who has a taste for enjoyment on a low key—to use John Burroughs' phrase. Among the Schuylkill hills there are many such pleasant lanes, half hiding between stone walls and fences that are buried in clambering vines, now skirting woodland or orchard, now winding up hill and along the ridges by cornfield and turnip patches, and now descending into little dales that carry in their laps brawling streams to feed the river.

In such places, these October days, we find the climbing bittersweet in abundance. This characteristic American vine, which dearly loves to climb a tree, 'is shyness itself in spring and summer; its flowers are so unassuming that they are rarely ever observed, and its foliage is of so conventional a pattern that it passes equally unnoticed in the general green livery of the wayside. But suddenly in the fall it flames upon our startled sight with showy bunches of orange-colored berries, which after a hard frost burst open and glow yet more ardently because of the fiery red-coated seeds which are within. Bittersweet berries retain their brightness indoors for months, particularly if gathered unopened before the frost touches them, and are among the most cherished of decorations in some rural homes. The vine is a famous contortionist, and often twists and doubles upon itself to a remarkable degree.—*C. F. Saunders in Philadelphia Record.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

COFFEE-LEAF TEA.—It is possible that the leaves of the coffee tree will one day become marketable. A chemical analysis shows that the leaf contains all the characteristic properties of the berry, but is richer in theine. The natives of Sumatra make a drink from these leaves, and Europeans who, presumbably, have tried it on their own account, declare the coffee-leaf tea to be a pleasant and refreshing beverage.

THE BRAMBLE.—The common wild blackberry in England is *Rubus fruiticosus,* as named by Linnaeus, and it is as fond of living in a hedge as is a gypsy. Its blossoms are as often pink as white and have somewhat the look of raspberry flowers. They appear first when summer is well advanced, and the fruit is ripened all through the autumn. Country folk usually know the plant as the bramble—a name imperishable, for was it not into a bramble bush that the wondrous wise man of the nursery rhyme fell and scratched out both his eyes?—*S.*

CANKER-WORM AND SLIPPERY ELM.—The past spring the elm trees on our streets here were entirely stripped of foliage by the Spring canker-worm. In some places the worms were so thick on the sidewalks that people had to go out in the road to get by them. I noticed on some streets where there were a few slippery elms that the worms skipped them entirely, or in a few cases it looked as if they had started on a few leaves and found them not to their taste. I could not find a slippery elm in town that was eaten to any extent. Is it generally understood that they dislike this tree?—*Walter M. Buswell, Charelstown, N. H.*

WHITE BLUEBERRIES.—Apropos of the paragraph about pink blueberries in the October number of this magazine, it is interesting to note that in the November number of *Rhodora,* Mr. Walter Deane has described and named several white fruited varieties of the blueberry. The white berried form of *Vaccinium Pennsylvanicum* is named *leucocarpum* and that of *V. Canadense, chiococum.* The commn high bush blueberry (*V. corymbosom*) already has a black fruited variety known as *atrococcum,* so that albino forms of this will now be known as *V. corymbosum atrococcum leucoccum.*

ANTIDOTE FOR IVY POISONING.—I believe in proving all things in order that we may cleave to those which are good and when I saw the reiteration of the statement made in *Popular Science,* I resolved to bring the matter to a test by experiencing ivy poisoning for myself. Consequently I am a wiser if not sadder man. The ivy poison "took," as the doctors would say beautifully. Two days after the application of "Rhus tox" the eruptions together with the suffering, commenced. For two days I employed juice of the wild balsam or jewel weed (*Impatiens fulva*), but the state of my arm grew steadily worse. Then I gave over the experiment, satisfied of the mythology of the remedy, and used camphorated sweet oil and extract of witch hazel, which were effective.—*E. W. V.*

POISONOUS GARDEN PLANTS.—Among the garden plants commonly in vogue which possess a poisonous nature botanists mention the Jonquil, white Hyacinth, the Snowdrop, the Narcissus being also particularly deadly, so much so, indeed, that to chew a small scrap of one of the bulbs may result fatally, while the juice of the leaves is an emetic. The berries of the yews have killed many persons; and it is pretty well known nowadays that it is not safe to eat many peach pips or cherry kernels at once. The lobelias are very dangerous, their juice if swallowed, producing vomiting and giddiness, with pains in the head. Lady's slipper poisons in the same way as does poison ivy. The bulbs seem to be the most harmful. Lilies of the valley are also as much so. There is enough opium in red poppies to do mischief; and the autumn crocus, if the blossoms are chewed, causes vomiting and purging. The leaves and flowers of the oleander are deadly, and the bark of the catalpa tree is very mischievous.—*Indian Gardening and Planting.*

ORIGIN OF THE COCOA PALM.—It has always been a question whether our familiar cocoanut is the fruit of a species of palm (*Cocos nusifera*) native to the warmer parts of this continent, or whether it was introduced by the early Spanish explorers from islands in the Pacific ocean. Opinion has frequently leaned in favor of its introduction by the Spanish; but in a recent contribution from the United States National Herbarium, Mr. O. F. Cook insists upon its American origin. In defense of his argument he cites among other facts that the whole family of plants to which the cocoa palm belongs, consisting of about twenty genera and two hundred species, are, with the single exception of the African oil palm (*Elaeis guineensis*), of American origin. Mr. Cook conjectures that the original home of the cocoanut was in some of the sheltered valleys of the equatorial Andes, where elevation moderated and equalized the temperature and the volcanic soil furnished the alkalinity which the species apparently finds congenial on the seashore, and which it is unable to obtain in inland localities having a heavy rainfall. The cocoanut is said to resemble the date palm in this preference for alkaline soils, but differs in being much more sensitive to extremes of temperature. Apropos of this last statement it may be noted that the inhabitants of the West Indies have a saying that to come to the best, the cocoanut must grow "with its roots in water and its crown in fire."

EDITORIAL.

Of the many interesting customs and superstitions brought to Louisiana by the multitudes of her people who came from Southern and Central Europe, one of the most charming that still persists in the city of New Orleans is connected with All Saints' Day, the first of November. This is the great Autumn holiday upon which the entire population turns out to do honor to its dead, and surpasses even Thanksgiving Day in importance. From sunrise until nightfall every cemetery is thronged with people intent upon "visiting the dead," as the phrase is. In communities where earth burial is the rule, this term would have less of significance; but here, where water is encountered anywhere eighteen inches beneath the surface, all but the poorest are entombed in temple-like structures of brick, granite or marble, and the cemetery is literally "a city of the dead." As may be expected, flowers play an important part in the ceremonies of All Saints' Day; in fact, it is the principal part. Bouquets, wreaths and more elaborate pieces almost cover the entrance to each tomb. No one considers himself too poor to afford at least a few flowers to lay at the tomb of those of his family who have gone before. Roses, chrysanthemums, dahlias and various Autumn flowers are seen in profusion, but mingled with the others are many set pieces composed of artificial flowers. As a whole the day reminds one of our Northern Decoration Day, but with a strain of solemnity running through it not observable in the Northern holiday.

It is not an uncommon belief among followers of the natural sciences, that anyone capable of perceiving a new fact is equally capable of setting forth in print his ideas upon the subject. As a result, many of the scientific journals, while filled with the most interesting facts, are exceedingly dry reading, because of the way in which the facts are presented. In his recent address before the Botanical Society of America, Dr. B. L. Robinson, the retiring president, touched upon this subject in the following pertinent words: "In this matter of presentation, the natural sciences seem to be at a peculiar disadvantage. In belles-lettres a work of crude literary form is damned. Authors, if they would be read, must cultivate a good style. But in the natural sciences, if a work only presents some new and valuable facts, it must, in spite of the crudest form, be purchased, read, reviewed, quoted, and the author is often flattered by the seeming success of a paper which may have been little better than an imposition upon his colleagues. Some improvement may undoubtedly be accomplished if the scientific public, especially editors and reviewers, can be stirred to a more critical attitude toward work defective in form. But important advance can only emanate from the authors themselves. They should take a greater pride in the style of their publications, should realize that lucidity of expression goes far to carry conviction, while obscurity is positive injustice to their co-workers."

BOOKS AND WRITERS.

—The Macmillan Company will soon issue "Old-Time Gardens," by Alice M. Earle.

—"Woodland and Meadow," by W. I. L. Adams, is to be published by the Baker & Taylor Company, New York.

—A book on "Forest Trees and Forest Scenery," by G. Fred Schwarz, has just been issued by the Grafton Press, of New York.

—Beginning with the January number, *The Bryologist* will change from a quarterly to a bi-monthly. The subscription price remains unchanged.

—A new book on Forest Trees, by Julia Rogers, of Cornell University, is announced for publication about January 1st. It will be illustrated by many drawings besides numerous photogravures of specimen trees.

—At last we have a book upon Southern wildflowers that the ordinary flower-lover can understand, and one that will enable him to identify most of the noticeable plants of the South with little trouble. It is entitled, "Southern Wildflowers and Trees," the text being by Alice Lounsberry and the many illustrations, both in black and white and in color, by Mrs. Ellis Rowan. This volume is third in a series in which artist and writer have joined forces, and in several respects is a considerable improvement upon those that have gone before. This is especially noticeable in the arrangement of the book, the thousand or more plants described being grouped in families and placed according to plant relationships. There is also a key to the families, based upon scientific principles, which ought to be of great assistance to the student in obtaining the names of his specimens. The illustrations are excellent and the artist, already well known, seems to have improved upon her earlier work. In the text each species is described in accurate botanical terms and its range and time of blooming given. Then usually follows more or less matter of an untechnical nature, which sets forth the uses, habits and folklore of the plants. In this part of the book, the author has been exceedingly unfortunate in construction, and it is safe to say that the book contains more involved specimens of English than have been given to the public in many a day. The nomenclature follows the most radical rules and is sure to be a stumbling block to all who have studied Southern plants by the manuals now in existence. The author has also fallen into the error of trying to make a common name for each plant where none existed. Such names as "Miss Vail's Haw," and "Addison Brown's Clematis" are scarcely likely to find acceptance among plant-lovers. With all its defects, however, this book will serve all the purposes of the Southern botanizer and we cordially recommend it to those living in the United States south of Virginia. The book contains more than 500 octavo pages, is well bound and is published by the F. A. Stokes Co., New York, at $3.65.

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THE WANING YEAR IN THE SOUTH.

By Willard N. Clute.

The frost is the magic dye-stuff with which Nature colors the garments of Autumn. The brilliant hues that crowd the green out of our Northern forests, late in the year, are rarely seen in regions unconquered by the cold. In our country they extend south, however, much farther than many imagine. The inhabitants of the New England and Middle States are likely to think of the Gulf States as the land of continued sunshine and flowers, but even these States know the sensations that come from freezing temperatures and flurries of snow. Their Autumn is not so unlike a Northern Autumn, except that it is slower in coming and more deliberate in passing. It is usually late in November before the brightest tints are assumed.

Although many districts lack that pride of Northern forests, the red maple, its place in the color scheme is not vacant. The sweet gum rather more than makes up for the loss. Its starry leaves put on many tints of scarlet and maroon that the maple cannot reach. And the sour gum (*Nyssa*) displays the same vivid coloring that makes it so attractive in the North. I do not know whether the oaks are more brilliantly colored here than further north, or whether they merely appear so against a background of dark green pines. At any rate, they are most conspicuous in various shades of red, yellow and bronze. There is, however, one remarkable exception to this in the live oak, which in these scenes of change and decay remains clothed in living green—a truly *live* oak.

The more I see of the live oak, the more I find to admire in it. The long sweeping strands of gray "Spanish moss" with which it is always ornamented, gives it a venerable appearance and a solemnity not found in other trees. Its short massive trunk and long level branches are not in the least like the airy gracefulness of the elm, and yet I find myself often associating them, mentally. Both have a sort of brooding, sheltering air that make them ideal trees for planting near dwellings. I do not know of a nobler object in Nature than an ancient live oak. One marvels at the sight of perfectly horizontal branches fifty feet in length.

A close rival of the oaks in effective coloring is that counterpart of the tamarack in Southern swamps, the bald cypress (*Taxodium distychum*). Like its northern ally it insists upon its little nap in winter and prepares for the event by dropping its leaves, becoming bald indeed. Before the leaves fall they turn to a fine reddish bronze that for some time spreads a pleasant light through its swampy retreats and blends harmoniously with the yellows of the ever abundant poison ivy.

There are a few dashes of color in the Southern Autumn not given by the leaves. That form of fruit, the berry, so abundant in the North, seems here to give way largely to the seed cup; at least I have been struck by the absence of berries in the thickets. But one must not overlook the dark shining berries of the cat brier (*Smilax*), whose prickly stems festoon the leafless shubbery by the wayside; nor can he omit the crimson fruits that cover the branches of the winterberry (*Ilex*) in moist places. The flowering dogwood (*Cornus*) is usually abundant also, and more heavily fruited, at least this year, than I have ever seen it in the North. There is still another berry, which, while it does not lend a special note to the landscape, may well be mentioned in this connection. I refer to the May-pop. Here and there swinging in the sunny thickets one sees this great berry, the size of a hen's egg or larger, still hanging on the vines. From these evidences it is easy to construct the Summer scene, and one imagines the glorious blossoms of the passion flower in place of these yellowing fruits. In the list of economic products these fruits have no importance, but children are fond of them and they rarely go ungathered. The construction of the fruit reminds one of the fruit of the mandrake or May-apple. The seeds are surrounded by a thin pulp and much juice. Only this juice and pulp is eaten. It is quite pleasant to the taste, being sweet and with a spicy flavor, reminding one strongly of its tropical relative, the grenadilla. It may be queried in passing why this fruit which ripens in Autumn should be called the *May*-pop.

Even in the South there are many trees that drop their leaves in Autumn, and not a few that do so without a suggestion of bright colors—with no last lingering contribution to the gorgeous pageant that is passing. The time for their winter's sleep having come, they begin it quietly and without ceremony, as a hibernating animal might go into its winter quarters. As the brown leaves fall a world within a world is revealed, for high among the leafless branches are great numbers of trim round tufts of mistletoe. These balls of green in the treetops give the deciduous forests a curious appearance in winter. All summer long they have flourished unnoticed, but now the golden green of their foliage is conspicuous enough to constantly remind one of the approaching holidays.

While the mistletoe flaunts its colors from its elevated perch the shining prickly leaves of the holly are to be seen nearer the earth. In fact, the underwood seems scarcely to have changed color. There is life welling up from the warm moist earth that the frost cannot overcome. Many plants, it is true, are leafless and dead; but these finished their work long before chilly nights came, and dropped their leaves without a hint from the frost. The palmetto still shows in lush green thickets over millions of acres of swamp land and a multitude of other green things occur whose leaves give the stranger botanizer no clue to their families or relationships, and so cannot be mentioned here.

Thus Autumn fares in the State of Mississippi, but as one continues southward into Louisiana a gradual change in landscape and temperature makes him begin to distrust his calendar. A soft warm breeze comes up from the Gulf; men are at work in the fields setting out lettuce and cabbage plants or planting seeds of radishes and other hardy vegetables in full expectation that the coming weeks will bring them full crops, and in the gardens the violets are blooming again. Surely this is more like spring as the Northerner knows it!

The second blooming of the violets is especially interesting. The scientist is inclined to fancy the petal-less or cleistogamous flowers to differ in some essential particular from the showy ones; but the behavior of the plants here show plainly that each kind of flower is merely the result of a different temperature. During the cooler parts of the year the showy flowers are produced, but as the heat increases the flowers begin to dispense with petals and thus the apetalous flowers are found. The common blue violet of the North has this same trait. The Northern Autumn, however, is too short to permit much of a show of flowers at that season. At the North, Winter and Summer separate the violet's season of bloom into two seasons; here Winter is powerless and the flowers appear throughout the Winter months and far into Spring.

The flowers in the wild lands have now about gone. It is somewhat exasperating to the flower lover to come upon woods and fields that can bloom but will not. This is just the weather that in the Northern States would give us hepaticas, blood-root, anemones and trilliums, but here Nature makes no sign. She rests if she does not sleep—no doubt she dozes in January. In marked contrast to the country side the lawns and gardens of the cities show scarcely any diminution of bloom. One of the chief glories of the Autumn days has been the flowers of the *Cosmos,* a bushy annual of the sunflower family, six feet or more high, that from October until mid-December or later is covered with a profusion of flowers the size of a silver dollar. The prevailing color is orange, but there are many shades of purple and white.

Even more conspicuous is the *Poinsettia,* whose great flowering bracts have lately taken on the most vivid scarlet tints and now fairly dazzle the eye. The *Lantana* bushes are still covered with yellow and orange bloom and chrysanthemums are plenty. But the roses, ah, the roses! Truly the rose is queen of flowers and reigns here undisputed. Such flowers as scent the air even in small gardens can be found in the North only in the most favored greenhouses. So long as one may stroll among such blossoms there is no need to sigh for the departure of Summer.

THE WANDERINGS OF ALFALFA.

Talk about blue blood; that would be a proud member of the Four Hundred who could trace his lineage back as far as can a certain cousin to the clovers that may occasionally be picked on our lawns and vacant lots and by the roadside. This scion of an ancient race is alfalfa, which is clover-like in foliage and flower, but the blossoms are blue. Twenty-five centuries and more ago, when Athens was the hub of the universe and all the outer world was considered barbarian by the Greeks, alfalfa dwelt unostentatiously in the valleys of that part of Western Asia inhabited by the Medes and Persians. When the wars arose between those people and the Grecians, and Darius made his famous expeditions into Greece, our little plant appears to have gone along. Perhaps its seeds were transported by accident in the camp baggage of the Persian hordes, or possibly some enterprising Greek prisoner escaping from Media, brought seeds home with him and established the culture of the plant in his native country. At any rate, into Greece it came about five centuries before Christ, and doubtless helped to make Alexander's charger Bucephalus the horse he was. When Greece became absorbed into the Roman Empire, alfalfa won the favor of the conquerors, who cultivated it extensively for fodder, for their army horses, and introduced its culture into Italy. The poet Virgil mentions the plant in the Georgies under the name of Medica—a word which in spite of its looks has nothing etymologically to do with medicine, but simply means the herb from Media.

From Italy its culture spread northward into Middle Europe, and westward into Spain. It was in the latter country that the name alfalfa, an Arabic term, became attached to it, indicating that it was under cultivation in the Spanish peninsula at the time of the Moorish occupation.

When Spain extended her sovereignty across the Atlantic a new world was opened for alfalfa to conquer, and it made good use of the opportunity, establishing itself as a blessing in the bloody trail of devastation which the Spanish conquistadors of the sixteenth century left behind them in Mexico and Peru. In arid regions, where no succulent grass would grow, and where clover would wither away, the alfalfa was sown, and by reason of its great length of root, which enables it to draw moisture from a great depth, flourished and increased. Down the South American coast it made its way as far as Chile, and from that country it was brought to California a few years after the admission of the Golden State to the Union. Thence its fame as a valuable hay plant possible of growth in the dry lands traveled throughout the West, until now it is the staple fodder crop on the Pacific coast and in the Rocky Mountain region, from Montana to the Gulf of Mexico. In Pennsylvania the abundance of other fodder plants has tended to keep the virtues of the alfalfa in the background, but in New York State it has been more or less cultivated for many years.—*C. F. Saunders in Philadelphia Record.*

HOW SOME SEEDS ARE PLANTED.

Examine a fruit of the common Dog Violet. It is a little capsule formed of three sections. As it ripens it opens along the lines of junction of these, and we get three narrow boat-shaped valves spreading horizontally from the fruit-stem, and each containing several seeds. The drying of these valves causes contraction. The two gunwales, so to speak, of each boat are drawn together, pressing more and more tightly on the seeds which lie between, till one by one the seeds spring out with considerable force.

Some of the Crane's-bills fling their seeds to a considerable distance by means of a more complicated apparatus. The fruit consists of five separate carpels attached by their apices to a spindle. Each carpel consists of an egg-shaped pouch containing one seed, prolonged into a slender rod, the whole adpressed to the spindle, so that the five pouches lie in a ring round its base. Each pouch is open on the side which is pressed against the spindle. As the fruit ripens, the more rapid shrinking of the outer layers of the rod of the carpel causes it to rupture the tissue which attaches it by its whole length to the spindle, and it curls with a jerk, carrying up the pouch, and causing the seed to fly out of the opening on its inner side already referred to. Lord Avebury placed fruits of the Herb Robert on his billiard table, and found that the seeds were in this manner projected to a distance of over twenty feet. Fruits of this kind have been aptly named sling-fruits. Nor is it beyond the powers of certain species to undertake even the planting of their seeds.

The Stork's-bills (*Erodium*), which are closely allied to the Crane's-bills or Geraniums, have curious fruits, each consisting of a torpedo-shaped seed prolonged into a slender twisted rod, which terminates in a long appendage set at right angles to the axis of the remainder of the fruit. The seed is furnished with bristles pointing away from the unattached end; and the twisted tail is hygroscopic—very sensitive to moisture. Now, if the seed be held fast, and the whole moistened, the rod will untwist, and, as a result, the free end will revolve like the hand of a clock. But if, as will more likely happen in Nature, this revolution causes the long appendage to come in contact with some obstacle—a blade of grass, for instance—then the motion will be transferred to the seed-bearing end, which will revolve like an auger, and, as a result of the lengthening caused by the untwisting of the rod, the seed will be forced into the ground. The upward-pointing bristles will come into play if the rod dries again, tending to hold the seed down in its place in spite of the contraction, and to drag down the opposite end instead; another moistening will cause the seed to burrow deeper.—*Knowledge.*

DEATH OF THOMAS MEEHAN.

The long and eventful career of Thomas Meehan was ended by his death at Germantown, Pa., November 19, at the age of 75 years. Mr. Meehan came of an old Irish family and was born near London, England, March, 31, 1826. As a boy he showed a marked fondness for botanical study and at the age of 15 published his first scientific paper. Subsequently he pursued a course of study at the famous Kew Gardens, and having decided to make horticulture and botany his life work, emigrated to America, landing in New York on his twenty-second birthday. Shortly afterward he went to Philadelphia, where the rest of his life was spent.

His sterling qualities as citizen and scientist won him many unsought honors. He was elected and continuously re-elected a member of the Philadelphia City Council for his district for a quarter of a century, and was also a member of the Board of Education for nearly as long. He has been vice-president of the Philadelphia Academy of Sciences for twenty-three years and was State Botanist of Pennsylvania under Governor Hoyt. As a member of the City Council, Mr. Meehan began a movement to secure more small parks for the city and succeeded in adding twenty-three to the number. The first of these was the famous Bartram's garden, and among the others was the garden of McMahon, an early Philadelphia horticulturist.

Mr. Meehan's contributions to science are said to number nearly a thousand titles, and his reputation as a botanist extends to the veriest novice in the science. As a writer he was clear, comprehensive and forceful, with the true literary touch so rarely attained by men of science. He was quick to see the nonsense in any preposterous proposition and was one of the staunchest advocates of a conservative course in species-making and naming.

Mr. Meehan's occupation was that of nurseryman, which business he has carried on, in conjunction with his sons, for many years near Philadelphia. He was also editor of *Meehan's Monthly*. Although a very busy man, he always found time to reply to requests for information from less fortunate botanists, and his loss will be mourned by many of us, who, though never having met him, yet look upon him as a friend.—*W. N. C.*

VITALITY OF WEED SEEDS.

An interesting light has been thrown upon the subject of vitality in weed seeds by Prof. W. J. Beal, in the *Michigan Farmer*. "In the fall of 1879," he says, "twenty-two years ago, I selected seeds of twenty-one kinds of plants, all of them common weeds except one. A considerable number of sets of these were buried in 'clean dirt,' consisting of sand from a depth of about two feet. Fifty seeds of each kind were counted out and placed in each bottle which was buried at a depth of two feet. The seeds were well mixed in each bottle with the sand referred to. At periods of five years a set has been dug up and tested. At the expiration of twenty years, *i. e.*, two years ago this fall, one set was taken out and the sand containing the seeds placed in two soup plates and gently watered. Some seeds were prompt in coming up and were removed and 'tallied' as they were identified. But there were laggards which skulked in the moist sand. I dried off the dirt for a rest from time to time, and on wetting the soil after two weeks to a month or more other seedlings appeared. The last long rest consisted of perhaps eight months, continuing until November 15, 1901. After five days three seedlings are already in sight and I am expecting others after a little more time. As I look at it, the delay of some seeds in germination is of great advantage to the weed, for, if a lot of seedlings start there may be too many to thrive well, and some will be choked and perish. Again, some of the seedlings, or all of them, may be killed by an untimely frost or by the ruthless hand of the tidy farmer and when the ground is stirred there is a reserve of seeds to start another crop as a second planting, and still others may serve as a third or fourth planting. In case all the seeds were favorably exposed when fresh, most of them, possibly all, would germinate. After they had been buried twenty years or more a variable number of seedlings appeared of the following species: Our most common prickly pig weed, mustard, shepherd's purse, pepper grass, mayweed, common mallow, evening primrose, smartweed, purslane, narrow leaved dock, a chickweed, the blanket-leaf mullein—twelve in all out of the twenty-one species buried. If any additional lesson were needed regarding the cost of growing a crop of weeds—of permitting weeds to get a start—here it is. If the earth is once well seeded and a man begins at once to keep each weed from going to seed, he will not kill the last seedling of the old crop inside of twenty years or more."

PROPERTIES OF GERANIUM ROOTS.

Species of Crane's-bills growing in Europe and Asia have been known from remote times to possess medicinal virtues. Dioscorides mentions a plant called geranion as employed for its astringent properties, and Pliny alludes to two species which were known in his time.

The root of the Herb Robert (*Geranium Robertianum*) was formerly much used in European medicine for fever, consumption and jaundice, and externally as a resolvent. The herb is now almost entirely neglected. In many parts of the United States the root of *G. maculatum* is esteemed as one of the best indigenous astringents, and is included in the National Dispensatory. It is said to be free from the unpleasant taste and odor of the common European species of Crane's-bill.

Dr. Edward Staples in 1829 found the American drug to contain tannic and gallic acids and a red coloring matter. Messrs. Trimble and Peacock in 1891 again examined several samples of the fresh and dried rhizome and found gallotannic acid to occur to the extent of 3.2 to 6.7 per cent. in the fresh, and 9.7 to 27.8 per cent. in the absolutely dry drug. This principle is present in largest amount in April just before the plant blooms, and rapidly decreases until it reaches a minimum in October; thus pointing to the possibility of its being a storage material to assist the plant in blooming and perfecting its seed.

The astringency of other plants of this natural order has been observed in other parts of the globe. For instance, the root of the wild Pelargonium (*Monsonia ovata*) of South Africa has attracted attention for many years, and was probably brought to the notice of the early settlers by the natives. This plant is called *Neeta* or *Geita* by the Kaffirs, and being very astringent, it has been used with great success in dysentery.

The Kaffirs simply chew the root, which somewhat resembles that of the gentian, but a more palatable mixture is made by boiling four ounces of the root for twenty minutes in a pint of milk, and one or two tablespoonfuls are given every two hours. The plant is collected in January and February from the Vaal River district. Mr. J. Medley Wood, Curator of the Botanic Gardens, Durban, states that the root of *Monsonia biflora* is also used for the same purpose in Natal.—*Indian Gardening and Planting.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

INDIAN PIPE.—The Indian pipe (*Monotropa*) is not a specific American plant, as Mr. Ernest Waters Vickers in the November edition of the BOTANIST seems to think. I, myself, have collected *Monotropa hirsuta* (*M. Hypopitys L.*) in Danish forests, where also a smooth variety or species *M. glabra* exists. None of them are rare, and of both, but especially of *M. glabra*, one-flower forms (*M. uniflora L.?*) can be found. Both species are quite at home in Sweden and Norway, in the coniferous forests, of which *M. glabra* is the most common species. Nicholson in Dictionary of Gardening records *Hypopitys multiflora* (*M. Hypopitys*) from England, and Asa Gray in his Manual of Botany closes his description of the plant with "(Eu)."—*J. P. Pederson.*

STERILITY OF HYBRIDS.—Scientific men are fond of throwing it up to practical people that they are behind the times; but devotees of science are often among the crowd that live in glass houses and yet throw stones. Horticulturists have long ago learned that hybrids are as fertile as their parents; and orchids, gesneriaceous plants, and many other classes furnish abundant evidence. But that hybrids are sterile, or generally sterile, is still a doctrine on which many pretty "theories" are founded by leaders in science.—*Meehan's Monthly.*

PEACH PITS. IVY POISONING.—Whether from dearth of matter or other cause, there seems to be a tendency even in journals devoted to science to make statements that are either sensational or exaggerated. For example in the BOTANIST I find that it is "not safe to eat many peach pits at once." There seems to be as much qualification in this as in an "if." I am 74 and have for years eaten several peach pits (say half a dozen) two or three times a week, and have found them invaluable as a remedy for indigestion—indeed I save them for that purpose.—I observed that *Popular Science News* carefully refrained from committing itself as to whether it was the juice of the flower or the leaves (of jewel weed) that was the curative agent in ivy poisoning. The fact is that the exudation of the poison ivy is a gum that is only more widely scattered by being rubbed with *any liquid* except ammonia or spirits. Old woodmen chew some of the leaves and claim that the process exempts them. One curious fact that I have never seen referred to is that cattle are very fond of eating it and no baneful effects ensue. This I know.—*W.* [Notwithstanding what our correspondent says, it is well known that peach pits are poisonous if eaten in large numbers. Half a dozen pits, several times a week, however, would scarcely come in this number.—Ed.]

Mankind's Craving for an Alkaloid.—The notable fact that all substances wherever found which contain the alkaloid "theine"—it is the characteristic constituent not only of tea, but also of coffee, the mate and guarana of South America and the kola of Central Africa—are highly prized by the human race, would seem to prove that this alkaloid satisfies some common craving of all sorts and colors of men. But doctors disagree as to what precisely this craving may be and as to how and why it is satisfied by the drinking of tea or coffee.—*Indian Gardening and Planting.*

Rings of Trees.—On page 68, what do you mean by "a new ring of wood is formed next to the bark, and a corresponding layer of bark adjoining it?" Rather hazy is it not? It is not true that "each ring of wood remains a faithful record of the year in which it was formed," if it is intended to convey the idea that only one ring is formed each year. Climate affects this general conclusion. In hot countries several rings are formed each year, there being no season of rest, and the climate not needing the ripening of wood which is essential, indeed, indispensable in cold and coldly temperate climates.—*W.* [The writer from whom we quoted evidently meant that the ring of wood is formed outside the old wood (next to the bark) and that a new layer of bark is formed inside the old bark (next to the wood), which is quite correct. The new growth is between the old wood and old bark, part going to form bark and part to form wood. The article was written for the Northern States, and would not, of course, be applicable to trees in hot countries.—Ed.]

EDITORIAL.

When this issue is in the mails, the AMERICAN BOTANIST will be half way through its first year, and at the end of its first volume. It gives us pleasure to state at this time that the journal in its present shape is absolutely self-supporting. It is a rare thing for a botanical journal ever to be able to get along without assistance from some botanical club or other, and we look upon our success in this instance as an indication that the journal has been cast upon proper lines for the flower lover. If we thought, however, that it would always remain at its present size, we would promptly give up in disgust the task of publishing it. We want a larger magazine and we intend to have it. But it is our design to build slowly and safely. Just as fast as our circulation increases the number of pages will increase. As an example of our policy, we cannot do better than to refer to our other journal, *The Fern Bulletin,* which was begun as an eight page publication, but which has increased with succeeding years until every issue now contains thirty-two pages. We are making every effort to advance the circulation of the AMERICAN BOTANIST, and expect soon to add another four pages to each issue, without extra cost to our readers. If those who know of the journal will only recommend it to their friends, our first increase will come with the next number. As with all new journals, a large number of people have asked for sample copies without subsequently subscribing. But this does not make us uncomfortable; we expect to add them to our list later! There are always many who wait to see whether a journal is going to succeed or not before subscribing, and they are the ones who pay advanced prices for early volumes, just as they are doing to-day in the cases of *The Forester, Rhodora* and *The Fern Bulletin.* There are also other people who reason with the editor of a certain botanical journal that a dollar is too much to ask for a 16-page journal. But we reply, where else can you get as much of this kind of botanical lore for the same money? Besides, this is not going to stay a 16-page journal! We thought we started with a sufficient number of copies in reserve; but there are now less than 300 copies of the first volume on hand, and those who think of purchasing should do so at once.

BOOKS AND WRITERS.

—Since the publication of the "Illustrated Flora," by Britton & Brown, Dr. Britton has been at work upon a manual covering the Northern States and Canada, which should embody in a single volume all the essential features of the larger work except the illustrations. This has now appeared from the press of Henry Holt & Co., and is entitled "A Manual of the Flora of the North Eastern States and Canada." It is a very creditable example of book making, and although containing nearly a thousand more descriptions than the 6th edition of "Gray's Manual," is a somewhat smaller volume. To one who has no personal interest in the matter the book contains much to praise, as well as much to condemn. It is the first manual of our flora to be arranged according to the Engler-Prantl sequence of orders and of special value on this account. The greatest interest in this work, however, centers in the author's use of nomenclature and in his treatment of genera and species. One who turns from the well known "Gray's Manual" to its new rival will be met not only by a bewildering array of new scientific names, but by an equally perplexing number of "new species" or sub-species. Frequently, but not frequently enough, the descriptions of the latter are followed by the significant phrase, "probably a mere form." Nevertheless each is dignified by a trinomial in sounding Latin or Greek and backed up by a double citation of authorities. As an example of the changes in names we may take the order Orchidaceae. In "Gray's Manual" this contains seventeen families; in Britton's the number has grown to twenty-six, the additional families involving a change of names in no less than twenty-three species out of a total of fifty-two in the first named work. Moreover, the "Illustrated Flora," published in 1896, contained six generic names that differed from those in "Gray's Manual," while the new work contains ten more that did not appear in the "Illustrated Flora." The Orchidaceae, it may be noted, is only one of a large number making up our flora. Truly the botanist who can follow a system that permits so many changes in five years, must be easily satisfied! So long as species-making is governed by individual fancy and based upon no sound fundamental principles, we may expect many new species based upon such trival characteristics as color, size or varying degrees of pubescence. It is no surprise to see certain genera, in which the scientists have been most industrious, greatly increased in size. Thus in "Gray's Manual" *Rubus* has 11 species; in Britton's work 29. *Viola* has 19 species in the one and 43 in the other. *Panicum* has 25 species in Gray's volume, but the body of Britton's work contains 52, and the appendix brings the number up to 62 without exhausting the list of species described from the Eastern States by the gentleman who collaborated with the author in this part of the work. The difficult genus *Aster* was a favorite study of Dr. Gray's and he catalogues 54 species and 11 varieties. The new volume, however, has 78 species and 59 varieties! There is a suspicion among many excellent botanists that a large number are mere forms, too insignificant to be worth distinguishing by a scientific name. The reprehensible practice of making an "English" name for each plant that lacked one, has been followed, with the result that we are treated to such combinations as Circinate White Water Crowfoot, Short-haired Reed-Grass, Farwell's cat's-foot, Judge Daly's sunflower, Addison Brown's thorn, Stewardson Brown's Indian turnip, besides other names certainly neither English nor common, as Schedonnardus, Aphanostrephus, Amphiachrysis, and Tetragonotheca. Notwithstanding the defects here indicated, rather because of them, the book will be invaluable to botanists generally. It should be in every library that has a "Gray's Manual" upon its shelves. The price is $2.25.

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THE AMERICAN BOTANIST

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ARIZONA FLOWER FOLK.

BY A. A. FIELD.

An interesting section for exploration, particularly to one interested in plant life, is the territory north of the Santa Fe Railroad, where it runs through Arizona. Crossing the foothills of the Pinal mountains one is at an elevation of from six to seven thousand feet, yet here one runs across a world of interesting bloom, though many of the flowers are the same as those we find in the Eastern gardens. However, there is enough of unusual varieties to make a botanical research interesting technically and artistically.

There is a marked gregariousness among the flowers as well as among the birds of this section, almost all sorts and conditions growing in colonies as it were. It was in one of the cool nooks bordering a refreshing mountain stream that I chanced upon a little gathering of columbines, the rarer variety *Aquilegia flaviflora* which we sometimes see in gardens. It is by far the handsomest and most luxuriant member of the family with its rich yellow bloom, though the old legend of the doves drinking from a nectarie of sweets, which some thought this flower resembled, would in this flower have to change its feathered representatives to swans, so slender and long are its graceful spurred petals. Here, too, one runs across a member of the hair-bell family, generally *Campanula rotundifolia,* much lighter in color than in Montana and the cooler regions where its rank growth makes the way almost impassible, and when in bloom the earth rivals the deepest of summer skies in rich color, and one seems to literally walk in heavenly blues. A bit lower down on one of the mesas blooms worlds of the scarlet gilia (*Gilia attenuata*), the flowers of which greatly resemble the tree cypress, and one is dazzled by its brilliancy which looms up like a great scarlet blanket thrown across the foothills. I also found a few blossoms of the American colombo (*Frasera speciosa*), with its small purplish flowers, but with which I was not at all acquainted. Near the mountain rivulet grew some greenish flowered umbrellawort (*Oxybaphus angustifolius*), neither pretty nor interesting. Lower down I found many plants of the stemless loco-weed (*Oxytropis Lamberti*) which is said to drive horses insane if eaten by them. A smooth beard-tongue (*Pentstemon Torreyi*) I think, grew here luxuriantly, as also did the wild arnica which in its season literally covers the foothills, casting over them a sheen of that gold for which many a poor prospector has sought in vain, and lost his life in consequence amid these trackless mountains.

Another of our Ohio flowers flourished well on the same foothill, and that is the verbena, which cultivation has greatly improved. This western variety is the small flowered purple, *Verbena bipinnatifida.* A rather rare find were some prickly poppies, which open their great white flowers, nearly as large as a saucer, after the sun has passed far toward its setting. I have found them growing rankly upon a pile of rocks where there seemed positively no sustenance whatever. I think this member of the poppy family is probably *Argemone alba,* but its relative, the California poppy, which blooms in Gila County early and late and hides not its glowing face from the sun, is much more in evidence. Speaking of yellow bloom, it is perhaps too visionary to suggest that the hidden gold of the mountains is reflected in these flower faces on the surface of the earth, but nowhere did I ever see such profusion of yellows as cover the foothills of Arizona. Between the flowers and the sunlight one gets literally steeped in glittering gold. The yellows that are the most profuse bloomers are the prairie zinnias (*Zinnia grandiflora*), the arnicas, the mustards, the poppies, two or three varieties of yellow cacti, though these are more of a lemon yellow, the golden portulacas and another yellow flower, *Riddellia tagetina,* which looks like the garden catchfly and has, I believe, no common name. But all color waves have their day in this sunny region, for when it is not a world of yellow, it is a world of red or blue. A most profuse bloomer is the wild lupine (*Lupinus pusillus*), as is also the blue larkspur, which takes on a much richer color than our eastern flower.

All of these gay flowers are prodigal of their bloom after the rainy season, but one is forced to add that it is sometimes two years between showers, a bit discouraging to the members of the floral kingdom, save the cacti and plants located near the mountain springs. There is a handsome red mallow (*Malvastrum coccineum*) that grows on the mountain side, small and clustering like the verbenas, in which family I should place it if not contradicted by specialists who are so ready to disturb and distrust general conclusions. Another red flower is a kind of painted cup, *Castilleja indiversa,* with lots of green in its make up, and these with the gilia and red portulaca, gives the hills a vermillion haze in their season. But nothing can out-rival the scarlet of the red cactus bloom, small flowered but profuse. A mass of crimson seen by a party of us one day while riding over a mountain trail, created confusion in our ranks, for our guide at first took it for a scarlet Indian blanket, out of which might develop an Indian, and if one Indian, more Indian; under the circumstances not a very desirable contretemps.

ELEMENTS DESTRUCTIVE TO OUR NATIVE WILD FLOWERS.

By Frank A. Suter.

The principal element destructive to our native flora has existed for over three hundred years, and begins with the advent of civilization upon the American Continent. The destruction caused by the extensive removal of wood-lands, and their subsequent cultivation is probably greatest of all. Plants thus driven from their environment are obliged to seek other habitats or perish. As a result, many of our native plants have become localized and dependent upon the protection of some indulgent landowner. How often must we learn that some favorite haunt of our childhood days, where we used to hunt the hepatica or the shooting star, is about to be turned into cultivation, or that some botanical resort is to be drained and put under the plow. Such a course means the certain destruction of the plants in that particular place.

But civilization, in itself an unavoidable and excusable agent, is responsible for a destructive force equally potent. It is generally admitted that the flora of Europe is of more recent origin; newer and therefore more highly developed and capable of adaptability to a greater extent, than its more beautiful American rival. From the time of the discovery of America and the influx of the colonists, the importation of grains and vegetable seeds from Europe has been the means of transplanting into the American soil, many new species of European plants, and, unfortunately, many of its most obnoxious weeds as well. Because of their greater adaptability, the plants thus introduced from Europe, from small beginnings, have spread until some of them are now numbered among the most widely diffused plants in the United States. The dandelion and shepherd's purse, both of European introduction, are typical examples. What native plant possesses means of seed distribution equal to that of the dandelion? Or what native weed, if there be such, can maintain an existence in field and street, upon deserted ash heap, or by the trodden wayside, like the sturdy shepherd's purse. The Canada thistle, the troublesome docks, the Jamestown weed, and many others of foreign origin, survive because of their superior adaptability to their environment. And yet there would be no possible conflict, if these plants did not outgrow the limits of civilization. Like the English sparrow, in its encroachments upon our native birds, these plants do not confine themselves to the city and town, but have found their way into the fields and woodlands; yes, even into the most secluded haunt, daring to grow side by side with the delicate orchid, thriving, spreading, increasing until the native plants are suppressed and die.

Although the destruction due to these elements is, in a great measure, unavoidable, there still remains a destructive agent, which can and should be avoided, and is therefore inexcusable. I refer to the ruthless destruction of our choicest American beauties for the sake of fashion, selfishness, or the thoughtless plunder of specimens in the so-called interest of science. In the first respect, probably no flower suffers more extensively than that loveliest of all early spring flowers, the trailing arbutus. Its beautiful, fragrant blossoms sell for good prices in the cities, while the growing scarcity with the increased demand make profitable an industry, which will eventually exterminate the species. The azaleas, laurels, and the holly are, in their seasons, subjected to similar depredation. The spring beauties, shooting stars, adder's tongues, wood violets, columbines, anemones and bloodroots are the prey of the many May-parties which are thoughtlessly robbing the wooded hills along our streams. The inexperienced students of Botany are also often guilty of injudicious gathering of specimens. It is sad to see a crowd of high school pupils turned loose upon a patch of bellwort or wood anemone, or others of our rarer species. Unaware of the harm they are doing, without the caution or advice of teachers, oftentimes, how can we blame them? But the careless destruction of plants is a fault confined not alone to the elementary and inexperienced students, for it is common to many botanical collectors and professional plant gatherers, who are or should be, aware of the danger of extermination, which they are helping increase,—a danger which all true botanists and plant lovers are seeking to prevent.

SOME CALIFORNIA CACTI.

There is, perhaps, no State in the Union blessed with so varied a flora as is California, and of this flora there is no section so interesting, yet withal so deceiving, as the cacti of our arid lands. I say "deceiving" advisedly, as many a tourist who has innocently attempted to pluck the delicious-looking fruit of the "tuna" will voluntarily testify. But his fear and dislike of them, given forth from his seat on the "overland" in the form of a wearied exclamation, "More sand and cactus!" will probably change, before he (or she) leaves for his Eastern home, into a positive mania for collecting these peculiar plants, crowned as they are with beautiful waxy blossoms of varied hue.

When it is known that there are extant over seven hundred species of cacti, the folly of any attempt, in the scope of so brief an article as this, to give a list even of the families, must be at once apparent. My only effort, then, shall be to give a brief idea of the more common of our wild forms, which are to be met with almost from seashore to mountain top.

According to the best authorities, the cactus was unknown to the Old World prior to the discovery of America by Columbus, though now it is as plentiful along the shores of the Mediterranean and in other arid portions of Asia and Africa as it ever was in our own deserts. Like camels, ostriches and other forms of desert life, the cactus has developed within itself—by means of its fleshy leaves—a perfect storehouse of nutriment, capable of withstanding the rigors of drought from one rainy season to another.

What we call the "leaves" of the cactus in reality correspond to the trunk and branches of other shrubs, while the leaves themselves have been retarded until they are degenerated into the spines and thorns which prick us when we attempt any undue familiarity.

All plants grown in arid places tend to develop very thick, succulent stems, having little or no leaves, but a very thick skin to prevent the absorption of their life juices by evaporation. A very good instance of this is to be found in the common "ice plant" which grows so thickly along our beaches, just above high-water mark.

Further, as every plant must absorb its carbon from the air in the form of a gas, it follows that plants of this class tend to present the greatest possible expanse of surface to that air, and, on the other hand, have widely-spreading roots, set shallow in the ground, so as to get the greatest possible amount of nutriment and moisture from the earth. Lastly, as a super-fine product of the evolution of a species, we note that the cactus presents (as I have said before) its true leaves in the form of spines for the sole purpose of protecting itself from such animals as, wandering in desert regions, would seek to eat it. Some cultivated forms of cacti have no spines—or, merely rudimentary ones—they being unnecessary, owing to the protection of the plant itself by man.

Very properly, moreover, the cacti have developed into wonderfully prolific forms. So much so that even a small section of a "leaf" will, if planted, take root and produce another plant of the same kind. Many forms have most beautiful blossoms. Take, for instance, the night-blooming cereus, which is a cactus, pure and simple, and a close relative of the ungainly giant cactus of Arizona deserts. Some of these latter attain to a height of more than fifty feet, a diameter of two or three feet, and are covered the whole way with myraids of poisonous spines or thorns.

Of the species indigenous to Los Angeles county, all are relatively small in size, but none the less interesting and beautiful. The most plentiful of all our forms is the "prickly pear," a species of tuna known to botanists as one of the Opuntias—a large group of flat-lobed cacti. The fruit of this is commonly eaten by Indians, children, birds and even some forms of quadrupeds, such as skunks, ground squirrels, etc. In some parts of the Southwest this cactus is fed to cattle in time of drought, the spines being first removed by burning. Southern California could as well afford to lose her missions as her huge beds of this cactus. In fact, to me, at least, the beauty of an old Spanish abode is doubled by the presence of the usual clump of cactus, crowned with vari-colored blossoms or dark-purple fruit; as the season may be. About many of these old haciendas cacti (mostly of this variety) were planted as hedges, while to this day delicious preserves and jellies are made from its fruit by the older Mexican women.

The "rainbow" cactus, so called on account of the varied and brilliant colorings of its spines, is found in the dry washes of our canons. This plant is globular in form, covered with spines, and bearing a profusion of large crimson flowers. It is a species frequently seen in eastern hothouses, but should not be confused with the "old-man" cactus, which does not, to my knowledge, grow wild in Los Angeles county.

The Cholla, or cane cactus, bears about the same relation to the traveler in Southern California that the "wait-a-bit" thorn does in South Africa. Its spines seem rather more poisonous than those of other species, and there is a popular belief—based on the elasticity of the stem of this plant—that it leaps forward to meet the unwary person who approaches too near to its place of growth. It, too, bears a beautiful yellow blossom, though, in common with the flowers of most other cacti, it has an unpleasant odor. From its stem, when the fiber is dry and hardened, handsome canes are made. Its fruit amounts to little or nothing, being too small and filled with seeds to furnish food for anything.

The flowers of our cacti are as variable as the plants themselves, while their coloring ranges from the purest white to deep crimson, the intermediate shades being the most delicate found in any known flowers. These flowers produce immense quantities of pollen and bees and other like insects gather in numbers on cactus beds to collect this food.—*Harry H. Dunn, in Los Angeles Times.*

PLANT PARTNERSHIPS.

A true parasite draws its nourishment wholly from the plant to which it has attached itself, giving no return except the ungrateful one of injuring or killing its host. A true saprophyte is supposed to live wholly upon humus or decayed vegetable matter. A true symbiot is a plant which has formed a partnership with another plant or plants; a partnership of such a nature that the benefits are mutual. Now it so happens that there is a striking resemblance in habit between certain members of these three classes of organotopic or dependent plants. Certain root-parasites, certain saprophytes, and certain symbiots are, in fact, so similar in appearance that it is not strange they have until lately been placed in the same category. Superficially, beech drops and coral root and Indian pipe appear to be nearly identical in habit. It has remained for that little detective, the microscope, to demonstrate that they are entirely different in their relations to the plant world and in their mode of obtaining subsistence. The first, beech drops, is a true parasite, and, like the lower fungi, subsists entirely upon its host; the second, coral-root, so far as present knowledge goes, lives, like the fleshy fungi, on decayed vegetable matter, and may therefore be considered a true saprophyte; the third, Indian pipe, until recently regarded as truly parasitic in its mode of living, has been proved to be a true symbiot. If parasitic at all, Indian pipe should be a root-parasite, but it has been proved that its roots have no connection whatever with the roots of other plants. Careful investigation has also shown conclusively that it does not subsist on decomposed vegetable matter; therefore, it cannot be a saprophyte. How then does it beg, borrow or steal its nourishment? It has been demonstrated that Indian pipe is a true symbiot, "being in its existence closely bound up with that of another plant which contributes to its necessities, but is equally benefited by this connection." The late Dr. Charles Mohr in the "Plant Life of Alabama," states the relation as follows: "Immediately after their germination the rootlets of these plants are infested by the vegetative threads or spawn (mycelium) of a fungus, which, as the plant develops, fastens itself upon every root, finally enveloping the rootstalk in a thick film, the higher plant drawing its nourishment solely from the elaborated food of the fungus." Whether the fungus gains anything more than a favorable site for growth is a question. It may possibly receive strengthening juices from the hospitable root.

So here we have a very curious state of affairs. A flowering plant, belonging to the highest sub-kingdom in the world, has formed a partnership with a member of the lowest sub-kingdom! It has sold its birthright, the right to make chlorophyll and thereby assimilate its own food from the soil and the air, for a mess of pottage, and has thus enslaved itself to the lowest of the low. In their inflorescence and mode of reproduction Indian pipe (*Monotropa*) and false beech-drops (*Hypopitys*) are closely allied to the heath family (*Ericaceae*). It is now known that many members of this family are to a greater or less degree dependent on the association of fungi with their root systems, the fungi taking the place of root hairs. Therefore, it is highly probable that the members of the Indian pipe family are degraded members of the heath family, having carried their borrowing propensity to extremes. It appears that the root system in their case is wholly enveloped, and that all the materials of subsistence are contributed by the fungus.

Both Indian pipe and false beech-drops may be found in this vicinity, the former in almost any wood where leaf mold abounds, the latter usually under oak trees in rather dry woods. The white scapes and single nodding flowers of the Indian pipe are familiar to every one—the brownish, several-flowered scapes of the false beech-drops are less frequently seen.

As noted above, these two genera, *Monotropa* and *Hypopitys*, represent the extreme of symbiotism in flowering plants. But the inference must not be drawn that all plants which have their root systems infested with fungi are necessarily decadent. The fact is, almost all forest plants, whether trees, shrubs or herbs, receive more or less nourishment from humus, or vegetable mold, and are accordingly partial saprophytes. Many of them also receive the assistance of fungi, and are accordingly partial symbiots. Four large families of plants are now known to derive such assistance in the work of absorption. They are the pine, oak, birch and heath families. In them the work normally performed by root hairs is largely done by fungus hyphæ and strands. These not only partially envelop the root, but they also force themselves in between the cells of the tissue. A root thus infested has been called a fungus-root or mykorhiza.

It is evident that the story of the dependent plants thus far is a story of greater or less degradation. Even before the true status of parasites was known the decadent tendency was recognized and such plants were suposed to be degenerate outgrowths from their hosts. A remarkable thing about dependent plants is that they lose entirely the external appearance of a vascular plant and even the whole structure of tissues characteristic of vascular plants, and yet retain unchanged the parts concerned in reproduction. A single organ, or parts of organs, may indicate the downward tendency more positively than the rest of the plant. The haustoria by which parasites attach themselves to and draw nourishment from other plants are degraded roots. In hemiparasites some divisions of the root remain normal while others are degraded into haustoria. In bastard toadflax (*Comandra*) the roots produce globular haustoria which emit a process that penetrates the tissues of the host. It seems that degradation affects the vegetative much more quickly than the reproductive organs of plants; a fact of which the orchid family perhaps offers the best illustration. The coral-roots constitute a case in point.—*From an article by F. W. Bachelder in Nature Study.*

THE PERSIMMON.

Our old lane will probably yield us a persimmon tree or two, and it is pleasant to look up into the thinning leaves and see clinging to the limbs the round, fat persimmons, like rosy little puddings tied about the throat. There has hardly been frost enough yet to soften their asperities—at least, in the neighborhood of Philadelphia—and we shall do well to treat very gingerly the fruit we may now find upon the ground. Something of the old malicious spirit lingers in persimmons which was in that strange fruit, sardo, that grew anciently in Sardinia and so contorted the faces of those who ate it as to give them a look of unreal laughter and so to human speech the adjective sardonic.

Nevertheless, few wild fruits are so dear to the American heart as this, which with many of us is associated with wholesome country outings and good times, and has a special place in popular song and story. It may not be generally known that ebony is the wood of certain species of persimmon trees that grow in tropical regions. Our North American variety, while presenting in its heart-wood—which is dark and close-grained—some characteristic of the ebony of commerce, does not develop a timber of much value.—*C. F. Saunders in Philadelphia Record.*

NOTE AND COMMENT.

Wanted.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

CASCARA SAGRADA.—It is said that the drug Cascara, extensively written about in medical journals, is the bark of two American buckthorns—*Rhamnus Purshianus and R. Californicus.—Mechan's Monthly.*

DISTRIBUTION OF THE BUTTON-BUSH.—According to *Indian Gardening and Planting,* our familiar button-bush (*Cephalanthus occidentalis*) was last year discovered in India. Its occurrence in Assam and a few other portions of Asia had previously been known.

PLANTS OF MT. RANIER.—Those who are collecting the plants of the West may be interested in knowing that Mr. J. B. Flett, Tacoma, Wash., has several first-class sets of plants, collected on Mt. Ranier, and identified at Harvard University, which he offers for sale at a greatly reduced price.

TO GROW COSMOS.—Unfortunately for those in the Northern States who wish to grow this handsome autumn flower, the seasons are rather too short for it to come to perfection. It is possible, however, to make a very good show with it by planting very early in spring in the house and transplanting when the weather becomes mild enough.

VERMONT BOTANICAL CLUB.—At the seventh annual winter meeting of this club, to be held at Burlington, January 24th and 25th, Dr. B. L. Robinson of Harvard University will deliver an address on "Some Recent Advances in the Classification of the Flowering Plants." This club is doing much to advance the botanical interests of the State. Botanists in other sections might follow their example with advantage.

THE HART'S TONGUE IN ENGLAND.—The hart's tongue, which is so great a rarity in America, is one of the commonest ferns in England and sometimes grows there in very unexpected places. The writer of this paragraph saw a little tuft of it last summer ensconced in the chinks of a high wall along a street in the quaint old town of Warwick. It was just out of reach, but by means of two children and sixpence, the treasure was finally secured.—*S.*

MANKIND'S CRAVING FOR AN ALKALOID.—The notable fact that all substances wherever found which contain the alkaloid "theine"—it is the characteristic constituent not only of tea, but also of coffee, the mate and guarana of South America and the kola of Central Africa—are highly prized by the human race, would seem to prove that this alkaloid satisfies some common craving of all sorts and colors of men. But doctors disagree as to what precisely this craving may be and as to how and why it is satisfied by the drinking of tea or coffee.—*Indian Gardening and Planting.*

USES OF THE PEANUT.—The principal use of the peanut, is not, as some may suppose, to furnish sustenance for visitors to the country fairs and the circus. Peanut oil commands a high price in market, being second only to olive oil in value. It is used in making soap, for lighting and as a substitute or adulterant of olive oil. Peanut butter is coming into use, and peanut flour is also said to be successfully made. The cake left after expressing the oil is valued highly as a food for stock and peanut hay is considered equal to clover or timothy. *The Florida Agriculturist* is authority for the statement that the United States sent upwards of seventy thousand tons of peanuts to foreign markets in 1899.

DISAPPEARANCE OF THE FRINGED GENTIAN.—In 1898 I went through a swamp beside the railroad which was full of fringed gentians—there must have been several hundred plants at least. I picked one plant that had fifty blossoms, including buds and a few just going by. I only took three or four plants and am certain that very few if any others were picked, yet I have never been able to find a single plant there since. If anyone can give a reason for this I should like to know what it is.—*Walter M. Buswell.* [The behavior of the fringed gentian has always been more or less of a puzzle to flower lovers. In the editor's locality it seems to appear and disappear at will. Doubtless the fact that the plant is a biennial and reproduced from seed every two years has some bearing on the question.—ED.]

EDITORIAL.

Everyone who reads these lines has one or more friends who love flowers and are therefore interested in articles on the subject. We want their addresses in order to send them sample copies of this journal. A postal card is all it will cost our readers and it will be a great favor to us. But leaving this last consideration out of the question, is there anyone who will not invest a single cent in good literature for his friends. We think not. Remember, the more names the better.

The segregation and description of new species has progressed so rapidly in recent years that the student who got his information from the old "Manuals" is quite perplexed upon taking up recent works. Instead of the old familiar names he often finds from two to a dozen segregates, with strange titles, occupying their places. While it is admitted that botanical science moves with the rest of the world, it is the opinion of nearly all thinking botanists, that this species making has been rather overdone and that the time is not far distant when many so-called species will be relegated to their proper places as forms or varieties of the species we have long known. In commenting upon this idea before the Botanical Society of America, Dr. B. L. Robinson said recently: "It is easy to see that species as now recorded in literature are by no means alike and that they cannot be regarded as equivalents in any complete and logical system of classification. Curiously enough, however, the term 'species' seems to be growing more and more popular as it means less and less. How anxious most discoverers of new forms are that their plants may prove species, not mere varieties and finally what a fascination the mere binomial appears to exert upon certain minds! Is it any wonder, under these circumstances, that the specific category has been overcrowded and made to include such widely different elements that the word species has lost nearly all its taxonomic significance?" Dr. Robinson asserts that species must be re-classified along more definite lines. What these lines are no one presumes to say at present. It is probable that they will differ somewhat in different groups, but a species will ultimately come to possess about the same values in any group. One thing is certain, however: the scientist who gives us the first fundamental laws for distinguishing these species from sub-species and forms, will make a lasting impression upon botany and be hailed as a second Darwin.

In the vicinity of New Orleans, where the thermometer rarely registers freezing temperatures, it is a source of unceasing interest to me to watch the bahavior of the plants. Were it not for an occasional breath from the north sweeping down the Mississippi valley and bringing with it a much lower temperature, many species that now are leafless would be green and perchance in bloom. The ordinary temperature is warm enough, but successive cold days put an end to renewed growth. At the first really cold night the lusty castor oil plants—many of them with trunks three inches through—wilted like poke-weed. The banana "trees" followed suit, and now, shorn of their leaves, stand with brown and ungainly stumps, waiting for spring. It gives one a curious feeling to see the banana turn deciduous; one would as soon expect it of the cocoanut. Certain palms weather the cold without protection, and many plants that drop their leaves in the North, here retain them. The elder is still holding to some of its leaves and no doubt will pull through without losing them all. On New Year's day, asters and goldenrods were still showing blossoms and the chickweed, of course, was in profuse bloom, but the woods and fields, for the most part, have a waiting expectant look. In the North, with such weather, I would have been sure of finding dandelions, but dandelions do not grow in this part of the world. Although not snowbound, Nature is nearly as dormant here as in New England.

BOOKS AND WRITERS.

G. Frederick Schwarz, author of "Forest Trees and Forest Scenery" is a scientist, but he has brought back from the woods and imprisoned in this little book some very readable matter about our forest trees and the character, distribution and adornment of American forests. He has a delightful style, entirely free from technical terms, and is particularly felicitous in his descriptions ily belongs the common furze or gorse, a plant as prickly as a thistle, the very reverse of what one would expect a sweet pea's relative to be.

Many cherished flowers of American gardens are familiar roadside wildings in England. Among such may be mentioned the ragged robin, the yellow pansy and the Johnny-jump-up. The last is particularly dear to the popular heart as is evidenced by the multitude of common names by which it goes, forty or more being ennumerated in Britten and Holland's "Dictionary of English Plant Names." One of these, "Meet-her-in-the-entry-kiss-her-in-the-buttery," is thought to be the longest plant name in the language. Another popular name of the same exquisite flower, and one that is said to be still in use in Shakespeare's native Warwickshire, is "Love-in-idleness," which occurs in a well known passage in "A Midsummer Night's Dream:"

"Marked I where the bolt of Cupid fell;
It fell upon a little western flower—
Before milk white, now purple with love's wound—
And maidens call it love-in-idleness."

The fox glove's languid bells, too, are common sights on roadside banks and in the woodlands of many parts of England. On the grouse moors many charming wild flowers bloom—most characteristic of which are the heath (*Erica tetralis*)and the ling (*Calluna vulgaris*). The latter is the famous heather of Scotland. Both plants grow intermingled on English moors and as they cover large areas, make, when in bloom, a sight not soon to be forgotten. The blossoms of the heath are especially beautiful—small globes of a warm rose color, borne in clusters at the summit of slender stems. The moors are also rich in the low bushes of the bilberry, a sort of huckleberry with reddish flowers that expand in the spring. The fruit ripens in late July and the country folk are usually permitted to pick the berries until the 12th of August when all trespassers are ordered off the moors, as that date marks the opening of the shooting season. In similar situations one finds the harebell (the blue bell of Scotland, one with our American species), yellow cinquefoils and white bedstraws, speedwells with blossoms nearly half an inch across, a blue-flowered polygala and the pigmy eyebright.

One of the oddest of the wayside plants is a small grass, sometimes only two or three inches high, which botanists call *Briza media*. It bears its flowers in comparatively large, panicled spikes, which are sensitive to the slightest breeze and consequently are almost always trembling as they hang. This peculiarity has, of course, attracted the attention of the country people, who in England, are rather more observant of plants than those in a similar walk of life in America, and the little plant goes by half a hundred different names in the various counties of the kingdom. Thus it is known as doddergrass, doddering dickies, earthquakes, shivering Jenny, wiggle-waggles and quakers—the last perhaps the most common.

A word may be said in relation to the trees. The characteristic British oak, in fact the only species that is really native, is the one known to botanists as *Quercus Robur*. It is a noble tree, akin to our white oak, and one does not wonder that among the primitive Celts and Tentons it was set apart as sacred to the greatest of their gods. Scarcely less beautiful is the British ash (*Fraxinus excelsior*), which seems of a rather statelier habit than the American species. Like the oak, the ash is associated with many an old world superstition. Readers of Norse mythology will recollect the sacred ash tree Yggdrasil, which bound the earth to heaven and to the underworld, and that it was from an ash and an elm that the first man and woman are said to have been created. The elm is one of the characteristic trees of Warwickshire, where the roads are often lined with magnificent specimens of it—not the American elm, however, but *Ulmus campestris*. A favorite tree in cultivated grounds and in the parks of the gentry is the European linden, or lime as the English often call it. It blooms in late July and perfumes the air to the intoxication, doubtless, of every bee in the neighborhood. Another common tree of the wayside is what the English style the Sycamore—really a maple, being in fact the *Acer pseudo-platanus*, which has been introduced to some extent into American cultivated grounds. It is a doubtful native of Britain, but has been so long established there that it has become a characeristic feature in the countryside.

Of cone-bearing trees there is none that is native of England except the Yew. This is frequently met with in churchyards and about gentlemen's country seats—a sombre, funereal-looking tree, 30 or 40 feet in height, famous in old times as the stock from which the British yeoman made his invincible bows. The Scotch pine often appears in abundance in sequested tracts, but it has been introduced from the Land o' Cakes. *Philadelphia, Pa.*

THE FLOWERS OF PIKE'S PEAK.

By Mrs. S. B. Walker.

During the placing of my exhibit of 300 square feet of the pressed flowers, ferns, etc., of Colorado, in Colorado Springs, last year, many comments were heard as to where this and that plant was to be found that were sometimes very wide of the mark. One day I went to the summit of Pike's Peak and thinking, grass from the summit and a few of the high, alpine flowers and ferns would be an added interesting feature, I placed them on ice inside the glass case. Later, standing with others near by, our attention was attracted by hearing a voice loudly declaiming, "Flowers from Pike's Peak at 13,000 feet altitude, grass from the summit; Gracious, there is not a spear of grass on the summit and not a flower within three thousand feet of the summit. I've been there myself!" and the party passed on.

Nevertheless, grass *does* grow at the extreme summit, and ferns are found near the top at 13,300 feet altitude, and they are not so rare, either. The tiny blue forget-me-not (*Myosotis alpestre*) is found at 13,500 feet altitude, growing in the shade of the overhanging rocks clustered about with grass and the deep blue, fragrant bells of *Mertensia alpina.* Against the lichen covered granite boulders in the background, tall and stately, throwing its crimson gleam far out, are fine specimens of *Primula Parryi.* The yellow flowers are supplied by *Senecio aureus* var *borealis,* while a trifle higher are found the cheery, more delicate blossoms of the golden saxifrages (*Saxifraga aizoides* and *S. chrysantha.*) The pink-purple blossoms of *Silene acaulis* are plentiful and growing fresh and crisp from its bank of snow is *Gentiana frigida.* All these varieties together with *Castilleia pallida* var *occidentalis Saxifraga nivalis, Draba, Polygonum* and many beside can be found on one trip, providing the trip is taken late in August.

THE BEGINNING OF A SOUTHERN SPRING.

By WILLARD N. CLUTE.

In southern Louisiana, the transition from Autumn to Spring is marked only by the briefest pause where the two seasons meet, such as one must expect while the scenes are shifting. Up to the very end of the year, a few belated asters and goldenrods are to be seen, while ten days later the first blossoms of the elm and maple are fringing their leafless branches. You may call this Winter if you like—there is an occasional frosty night and not infrequently trees bear icicles instead of flowers—but the violets and chickweed bloom through it all, and down in the warm, moist earth a thousand early plants are pushing up; in fact I am not sure that spring has not been lurking there all the while. It seems to me that last Autumn I marked the same aspiring points of green beneath the aftermath of Summer that are now lengthening in the swampy grounds. The city lawns are as green as a northern meadow in May and the grass—*Poa annua,* probably—is everywhere in bloom.

Most noticeable of the early flowering trees is easily *Acer Drummondii,* the southern counterpart of the northern red maple. To call this a red maple, however, but faintly expresses it. The red maple is quite pale in comparison. The flowers of the two species are nearly alike in color, but the fruit of the southern tree is of the deepest and most vivid scarlet, and glows among the grays and pale greens of surrounding trees with truly dazzling splendor.

Residents of this part of the world do not know the trailing arbutus, for that plant, like a true heath wort, keeps to a colder and more rugged land; but in its stead they have the devil-wood or sweet olive (*Osmanthus Americanus*) and ought to be satisfied. Although the olive often attains the proportions of a small tree, it has many characteristics that recall the arbutus. Its leaves are evergreen, and the flowers, though rather smaller are very similar in appearance. They are borne in axillary clusters and are probably more fragrant than those of the arbutus. The flower-sellers usually place a spray of these flowers in the center of their bunches of violets for the sake of added fragrance. The tiny stands of these flower-sellers, it may be added, are among the characteristic sights of New Orleans. Here and there, in convenient corners along the sidewalks—or banquettes as they are called here—they are located. At this season they are usually piled high with bunches of violets, and the buyer may have his choice of the lot for five cents.

As elsewhere, the weeds vie with other early flowers for first place. If the chickweed ceases blooming at all it must be during the dryest and hottest part of Summer, and other weeds appear scarcely less persistent. Late in January, I plucked a plant of yellow oxalis from between two paving stones in a city street and found it full of buds, blossoms and fresh green seed pods, the latter nearly an inch long. When the blossoms that produced these pods opened, is a matter for conjecture. I have a suspicion that the early flowers are cleistogamous.

No doubt the coming months will bring something fine in the way of wild flowers; but at present the woods have a deserted air to one accustomed to the sight of trilliums, bloodroot, bellwort, adder-tongue, spring beauties, hepaticas and the host of other flowers that make the northern spring beautiful. Here are acres upon acres of swamp land and not a single skunk's cabbage to push its spotted cowl above the flood and keep the peeping frogs company. Everywhere the earth teems with promises of spring—quickening seeds, unfolding buds, lengthening shoots, radical leaves daily spreading into larger rosettes, thistles already large enough to fill a wash-tub—but as yet few or no showy flowers, although various species of butterflies are winging their way over the fields apparently in search of them. The bulbous plants and plants with thickened underground rootstocks, from which the earliest flowers of the North spring, are rare or absent here. What shall it profit a plant to store up food against a time of bloom in a climate that will supply food as it goes along? "There is no need for haste; take life easy," seems to be the motto of both plants and people. But owing to this lack of haste on the part of the flowers one of the principal charms of early Spring is lacking.

THE BLOOMING OF THE HONEYSUCKLES.

Dr. Byron D. Halsted has been watching the blooming of the twining honeysuckle (*Lonicera Japonica*) and finds much of interest in the way the flowers open and provide for their insect visitors. He notes that the majority of the buds expand into flowers between six and seven o'clock in the evening and as soon as the corolla opens, exposing the stamens and styles, the strong fragrance is sent forth while the anthers show large quantities of pollen. In his article on the subject in the *Plant World,* he says:

"As the sun declines and the air gets more and more laden with the honeysuckle fragrance, due to the increasing number of freshly opened flowers, the various night-flying insects are in evidence. Among the most conspicuous of these is the sphinx-moth, which pauses before each of the white blossoms long enough to take a sip and then darts on to the next. So busy are they in their round of service, that, standing motionless, the interested watcher can have them close to his eyes, see the whole and exceedingly simple process all done while upon the wing. The down-turning of the single lobe of the corolla and the upturning of the other four united making an arched opening into which the long protruding stamens and style provide guides, combine in forming a cavity into which the proboscis of the moth is thrust, and the nectar being close at hand is easily removed without the flower forming any resting place for the insect attendant. The wonder is that the moths can sustain themselves so steadily in front of each blossom; but from the almost inaudible hum it is evident that the large and delicate wings are moved with remarkable rapidity.

The moth in question has a rival in the person of master humming bird, and so much alike are these to the unobserving observer that only a dancing, swaying, hazy, vanishing blur is seen in either case against the indistinct background of the honeysuckle hedge in the deepening twilight. The humming bird is less easy to study, and to get close to his fast fluttering wings is a rarity indeed. As soon as the busy bird is once recognized by his long, needle-shaped bill, bright, iridescent plumage, exceedingly quick, darting motions and characteristic humming of the wings he is not confounded with the sluggard of a moth or any other creature. The bird, like the insect, with which he might weigh in the same notch, pauses in the air before the evening blossom and quickly sips the nectar without indulging in the climbing method of alighting as is in vogue with the heavy, short-winged bumble bee. The bird makes a cleaner job of it than the moth in every way. His eye may be keener sighted and his body more submissive to his will. The bill may be a better instrument than the proboscis for extracting the honey. Who can tell whether the blossom and the bird are made for each other's best interests, and the moth is an interloper.

Those who are familiar with the honeysuckle blooms are aware that upon a vine some are white and others are creamy in color, then a light yellow-orange, and lastly a darker shade of the two neighboring colors as the flowers hang collapsed upon the short stems. The rapidity with which these blossoms pass these stages has been a matter of observation and surprise. Each of these branches usually has upon an average six successive nodes that are to bear blossoms, the series being preceded by a few neutral nodes and followed by an indefinite number that are entirely vegetative. The blooming of a series represented by any stem is usually compassed by a week or at most ten days—the rapidity seeming to depend upon the individual peculiarities of the plant or some circumstances of nourishment and the weather. During the period of watching there was a rainy day and night, and upon the intervening evening there was but little show of bloom and a noticeable absence of the characteristic fragrance, and of course of the insect and bird attendants. A halt was called in the regular procession of bloom that may or may not have affected the whole period of blossoming. But this is a fact that can only be obtained by extending the observations over many seasons.

To the reader unfamiliar with the *Lonicera,* it may be said that the long, slender, twining stems bear their leaves in pairs upon opposite sides of the stem. Between the bases of the leaf stalk and the stem above, a bud arises which quickly forms a stem an inch or so long, bearing a pair of small leaves, and between these two flower buds form. It is thus seen that at each joint or node upon the stem there are two brief side shoots each bearing two flowers—that is, four blossoms are produced with but very few exceptions at a node, or none at all. When once a series of flowers has begun there are no breaks in it until the end is reached. The four buds very regularly open upon the same afternoon or evening, and display their four white corolla lobes through the live-long night. The next morning they begin to take on a suggestion of cream color, which rapidly develops as the day declines, and becomes strongly in contrast with the four swelling white buds of the next younger node that are destined to follow along the same road twenty-four hours later. By the second evening the flowers have become orange-yellow and lost their fragrance—at least it is lost in the richness of the younger blossoms which become the only ones before which the moths and humming birds pause for their evening draughts of nectar. Of hundreds of such transient visitations the writer has never seen an old flower considered for an instant. They appear as oblivious to them as if they were not there. It may be that the eyes of the night flyers are color blind to the hybrid yellow-orange, while they are sharp indeed upon the white. With thoughts like these in mind I have watched the hedge-row as the darkness deepened until the old flowers passed from sight and only the fresh white ones stood out distinctly against the background of the obscured vegetation.

Sometimes one of the quartette of blooms gets belated and comes into flower along with the four upon the next younger node; but then it is out of place and the chances for visits are diminished, for the four make an attractive setting, and all can be sipped before advancing to the next group. The torsion common to the lonicera stems provides that all the flowers present a uniformly open front; in other words, they hang the banner upon the outer wall, even though it may be necessary to turn a sharp corner in the event.

It has been said that a new set of four flowers is not uniformly provided for each new day. That may be the rule, but there are dark days and rainy days, and so the uniformity is more or less broken. This, however, seems to be the rule—that no half-ways are indulged in, and if a bud is not quite ready to open upon one afternoon, it holds over until near the close of the next, thus giving forth its perfume upon the evening air, and at a time when night-loving insects may catch sight of its showy whiteness and sip its sweets, while incidentally bringing to it the pollen from some other blossom. Back of all the plan that has been written upon, there lies between the lines the deeper one of wide pollination, which perhaps both honeysuckle and honeysucker knew nothing about, and yet is essential for the well-being of each, and succeeds so well in the great struggle entailed upon all living things."

THE REDWOOD AND FOG.

As is well known, the redwoods occur in the fog-belt of the northern half of California and are confined in a markedly restricted manner to those portions of the coast mountain ranges, such as ravines, which, on account of favoring topographical conditions, the fog may reach. The restriction of the distribution to so narrow a zone, is, perhaps, not due so much to the negative factor, the conservation of moisture already present, as to the positive one, the actual precipitation of water from the fog. While this, without question, is an important factor in the total precipitation in any region subject to fog, it becomes very much more marked, I am convinced in that region where the redwood forests are found. The reason for this lies in the character of the foliage of the redwood. Because the leaves of the redwood are small and closely set together on the twigs, and because both twigs and leaves are relatively delicate, the boughs which they help to form are fern-like in general appearance and constitute a very effective filter, by which water may be "combed" out from the fog. In the effectiveness of this filtering process, which is said to be a good method for removing water from the fog, lies, I believe, an important reason why the redwood loves the zone subject to fogs.

So far as I know, there is no method in use for determining the amount of fog precipitation. The amount of water in a fog which extends vertically 1,000 feet may be equal to 0.1 inch rainfall. But, of course, only a small portion of this is precipitated. This amount, however, can be greatly increased if the fog is passed through such a filter as is formed by a redwood forest, and under such conditions the amount of water taken out of the fog by the trees is considerable. I have been told by a gentleman who owned a large ranch in the redwood belt, and whose observation was quite trustworthy, that whenever there was a fog, especially if accompanied by a wind, the soil beneath the trees appeared as if drenched by a heavy rain; and that, further, in cases of fires in his forest, if a fog came up, accompanied by wind, the fires could be brought under control.

The relation of the redwood to fog precipitation is shown in another way, which although sufficiently *bizarre* in itself, is vouched for, and may lend a hint to a possible method of estimating the amount of water precipitated in this manner. On the "hog back" of the Santa Moreno mountains lives a woodchopper in a place once heavily covered by a redwood forest, but where there is left only an occasional large tree. Like other mountaineers, he must use water for culinary purposes, at least, and in lieu of a convenient spring or well, he has devised a unique "tree-well." The chopper has fashioned the ground beneath a large redwood into the form of a trough at the lower end of which he has placed a barrel, and I have it on good authority that in this primitive manner he obtains sufficient water for his needs.—*From an article by W. A. Cannon in Torreya.*

SELF-PRESERVATION IN PLANTS.

The instinct of self-preservation in the vegetable world is perhaps not less, but merely less obvious than in the animal kingdom. Our scientific friends are apt to freeze our sanguine hopes by informing us with emotionless mien that the individual is of no moment, the preservation of the species, only being of consequence. Self-preservation is then but a step in the direction of preservation of species, and, broadly construed, must include the instinct of reproduction.

So anxious do some plants seem to avoid being the last of the line that they provide themselves with several means of procuring descendants. The common garden onion affords a convenient example. If a row of onions in the flowering stage is examined, it is probable that a considerable number will be found bearing both flowers and bulblets or "top onions," while we are all familiar with the onion having two or more cores. Here, then, we have one means of reproduction and two of multiplication; seed from the flowers, young onions or bulblets, and division in the bulb, forming what is known as a "multiplier."

The potato plant may propagate itself from the tuber or from seed; the strawberry by runners or by seeding; the verbena by seeding and by rooting at the joints or nodes. In some plants if a leaf falls to the ground, it will, under favorable conditions, strike and develop a new plant. This is true of some begonias, and remarkably common with *Bryophyllum;* and species of *Mesembryanthemum* are often propagated by cutting the plant in pieces and scattering them on the ground.—*L. A. Greata in California Floriculturist.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

ROOTING OF OXALIS LEAVES—In the *Plant World* for November, 1901, John L. Sheldon records the rooting of the leaves of several species of *Oxalis*. The leaves were broken from the plants and the petioles buried in moist sand. In a few weeks several put forth roots, especially the younger leaves. Upon some of these roots, tuber-like bodies were formed, but it was not ascertained whether the leaves could be made to produce true bulbs and tubers as the plants ordinarily do.

ORIGIN OF THE NO. 11 MANGO.—In Jamaica, the mango is one of the most important of fruits and in its season furnishes a great part of the food supply of the negroes. The trees are now thoroughly naturalized and the fruit is more or less varied in quality. The variety generally regarded as the best is known as the "No. 11." Regarding the origin of the name, a note in the *Bulletin* of the Botanical Department of Jamaica has it that in 1782 a British ship captured a French vessel bound for Hayti which had on board many economic plants and seeds. The vessel with her cargo was sent as a prize to Jamaica and was thus instrumental in introducing the mango into that part of the world. The plants in the cargo were numbered and No. 11 was the mango that has since become famous.

NON-INDIGINOUS FLORA OF OHIO.—Owing to various causes the flora of most areas is constantly, though slowly, changing. Sometimes this change is so rapid as to be noticed by the casual observer, as when a new weed suddenly spreads into new territory. Few realize how many different species in any given locality have appeared there since the country was settled. A pamphlet on the "Non-indiginous Flora of Ohio," by Prof. W. A. and Mrs. Kellerman, notes that in Ohio there are 430 species of introduced plants, or nearly twenty-two per cent. of the whole flora. Of these 36 are shrubs or trees, 47 are grasses, and 49 are in the class which the farmer regards as weeds. The remainder are species mainly of interest to the botanist. A list of 40 native weeds is presented for comparison, and it is interesting to note that the worst weeds are all in the list of foreigners.

EDITORIAL.

Some time early in the last century, Stephen Elliot began the publication of "A Sketch of the Botany of South Carolina and Georgia." After the first part was issued the author recalled it, and after making various changes, reissued it. The original issue seems to have been completely destroyed. Ordinarily this is not much to be regretted since we have copies of the revised issue, but a writer in the December *Torrey Bulletin* thinks otherwise. He says: "No copy is now known to exist, and if any should be discovered it would be of the utmost importance that fac-similes of it should be prepared and distributed, for there is no question, whatever, that it was properly published in every sense of the word, and if its contents were known it would necessitate the alteration of several names of southern species." Curious how the scientist occasionally looks at things, isn't it? To most people it would seem that if that old pamphlet should ever appear, with its threat to change the names of certain southern species, the best and quickest way to dispose of its case would be to throw it into the fire.

Notwithstanding the great interest that at present attaches to botanical studies, we have as yet no botanical society that has assumed a really national character. This is all the more remarkable because certain families of plants, such as the ferns and mosses, have such societies for their study. We have, it is true, a "Botanical Society of America," but this is an exclusive organization into which the ordinary botanizer may not enter. A national society which shall be democratic enough to admit any student of plants, while extending to him the fullest measure of assistance in his work is still desired. Among the objects of such a society would naturally be the protection of our native wild flowers, the preservation of plant names, the cultivation and naturalization of desirable species, the exchange of living plants, seeds and herbarium specimens, the assistance of its members in the study of plants and the recording of new facts concerning them. While there is no society that exactly covers this ground, the Gray Botanical Chapter of the Agassiz Association comes very near it, and our readers may find it advantageous to join it. This Chapter was organized in 1888 and was specially designed for helping beginners. It is principally engaged in the field study of our native flowering plants, but welcomes to membership all who are interested in any branch of botany. The annual dues are twenty-five cents. The Chapter issues as its official organ a monthly "Correspondence Bulletin," written by the members and containing records of personal observation. These Bulletins are sent through the Chapter from member to member and promote an excellent feeling of comradeship while stimulating each member to further study. Copies of the Chapter's constitution and further information may be obtained from the General Secretary, Mr. William H. McDonald, 122 Pearl street, Elizabeth, N. J., who will take pleasure in putting any lover of botany in the way of becoming a member of the Chapter, if desired.

People who are not botanists usually have a hazy idea of range in plants and fail to catch the enthusiasm of the student who rejoices at finding some insignificant weed hundreds of miles beyond its reported range. It is a common belief that plant species in general are likely to occur in almost any part of the world having the same temperature, and it usually requires considerable explanation to enable the average individual to comprehend that different kinds of plants, like nations, are restricted to certain definite areas on the globe. In fact, the average individual seldom thinks much about plants, except in the case of those with striking peculiarities, when he is likely to believe that they grow nowhere except in the spot where he has found them, and that they will not survive, even under cultivation in other localities.

BOOKS AND WRITERS.

—The late Thomas Meehan has been succeeded by his son, S. Mendelson Meehan, as editor of *Meehan's Monthly*.

—*The Bryologist,* which changed to a bi-monthly in January, has advanced its subscription price to one dollar a year.

—At the beginning of the year *The Forester* and *National Irrigation* joined forces and will henceforth be published as one journal under the title of *Forestry and Irrigation*.

—With its fourth number, *California Floriculturist,* of Los Angeles, has been considerably increased in size, a pleasing indication that this bright Western journal is prospering.

—We regret to note that a fire on the night of January 14th, destroyed the building and collections of the Manchester Institute of Arts and Sciences. The Institute's journal, *Nature Study,* suffered some loss, but appears on time as usual.

—It is but a comparatively short time ago that one who desired to make the acquaintance of our native flowers without an instructor to introduce him, found it an exceedingly difficult matter. A stubborn and persistent student might at last conquer a botanical text book, but to the great majority the scientific phraseology was too forbidding and the book might as well have been written in Chinese. We owe a vast debt of gratitude to the makers of the Manuals who amassed and recorded the botanical facts; but it may be questioned whether our debt to those later writers, who, by popular books, have opened this storehouse of knowledge to the general public is not still greater. Books of a popular nature are now so plentiful and approach the subject from so many different sides that the beginner can scarcely go astray. Even if he misses the way in one book, another will set him right. One of the best of these botanical guide-posts is "A Guide to the Wild-flowers," by Alice Lounsberry, published by the F. A. Stokes Company of New York. This treats of our wild flowers according to the kind of soil they inhabit, and describes nearly five hundred plants. Its value is further enhanced by sixty-four full page colored plates and one hundred more in black and white by Mrs. Ellis Rowan, which show about two hundred of the typical plants described. The book is an octavo and costs $2.75.

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FLORAL ECCENTRICITIES.

By Alberta A. Field.

How natural it is for us to interest ourselves in abnormal conditions, and also to be more observant of "their" than "our" oddities. But not alone on us supreme (?) creations of the universe do these eccentricities expend themselves, for there are many "queer people" among all sorts and conditions, from the highest to the lowest, and while less has been written upon the peculiarities of plants, much has been observed that must engage our interest. Sometimes these peculiarities are of the species and sometimes of the individual, but generally speaking they are abnormal. A little observation of plant life will teach us that they possess many human characteristics or attributes and upon occasion exhibit energy, endurance, ambition, sensitiveness (this in a marked degree), incongruousness, adaptability, modesty (but less of this characteristic than the sentimentalist would have us believe), secretiveness, determination, all these and more.

In speaking of the different flower characteristics I forgot to mention one of the most strongly marked, and that is the desire for the perpetuation of its kind, and there is no end to which a plant will not resort to secure this result. Since science has so enlightened us upon the subject of vegetable fecundation, our appreciation of the difficulties that many plants are obliged to overcome, is greatly intensified. In many cases the staminate and pistillate flowers grow on separate plants, and alien assistance has to be resorted to for the transference of the quickening pollen dust. Some of the more prudent ones, to guard against the accidents of destruction by the elements and other emergencies, produce cleistogamous flowers below or above the ground, which never open, but remain closed and amply self-fertilizing to prevent possible extinction, though most plants advocate cross-fertilization, fearing that the more simple method proves degenerating. Sometimes this careful forethought is a family distinction, as in the case of some of the milk-worts. For instance, the prudent *Polygala polygama* or racemed milk-wort's upper branches are covered with many open petaled flowers that advertise their wares conspicuously in order to secure the benefits of cross-fertilization. But below the surface on the tiny root-like branches are numerous pale little flowers whose work is in reserve in case the more beautiful blossoms fail in their natural functions. They insure the perpetuation of their kind though they never open their petals to admit the dangers of the elements, or risk a shortage of cargo-carrying insects. But a sad life must these little workers enjoy, while they minister to the economics of plantdom, for Cinderella-like they delve in the bowels of the earth with no prospect of a fairy god-mother to compensate them, and only a consciousness of a duty done, in reward for their sacrifices. But in the meanwhile, the more fortunate blossoms of the upper air, flaunt their gay petals through the summer gladness and flirt in the sunshine with passing bee and breeze.

Another little plant that bears the euphonious appellation of "Venus' Looking-glass" but whom scientists know as *Specularia perfoliata,* also bears these cleistogamous flowers. They do not hide themselves beneath the sod, but dwell quietly upon the base of the flower stalk, each clasping sheath of green carefully hiding three tiny little buds which are abundantly prolific in themselves, and they too avoid the dangers that society upon the upper stalks of life are exposed to, for they open no hospitable doors to bees or wind. But there are only a few of these flowers of high life that show their delicate beauty to an admiring public, and they are situated at the top of the flower stalk where they flaunt their bluish petals in the gladdening sun and enjoy life after the fashion of their kind.

There is a quaint interpretation of the naming of this flower which reads: "It is related that Venus one day let fall to the earth one of her mirrors; a shepherd found the jewel, and as soon as he had cast his eyes on the glass that possessed the power of embellishing whoever looked at it, he forgot his mistress, and only thought of admiring himself; Love, fearing the consequence of so foolish an error, broke the glass, and changed the remains into this pretty plant that has retained the name of Venus's looking-glass." But why Venus, that vain immortal, should raise so insignificant a memorial to her beloved mirror, passeth the understanding of the feminine.

It is said that there are about 55 genera of plants that contain one or more species, which so secure themselves in the matter of perpetuation, and among the more familiar are the violets, the peas (and the latter produce an abundance of cliestogamous bloom) wood sorrel, jewel-weed, etc. Yet all of these plants show evidence of their fear of degenerancy of self-fertilization for they all produce developed flowers that solicit the aid of insect life in the transmission of pollen. A careful study of the complex economics of the flower kingdom, positively astounds one by its system and forethought.

ORIGIN OF DOUBLE FLOWERS.

Reverting to the subject of double flowers, we may begin by eliminating those which in a botanical sense are not double. This sweeps away all the so-called double Chrysanthemums, Asters, Daisies, Sunflowers—all the Composites, in fact, which owe their epithet "double" to conditions which are not the same as those to which the botanist applies the world "double." Another class of so-called double flowers occurs when a petal, instead of remaining single, divides or branches either radially (some Mallows) or collaterally (Primrose). What, then, are double flowers? In a strict botanical sense, double flowers are those in which an additional number of petals is produced, either by actual increase of number, or by the substitution of petals for stamens or for carpels, or both (Rose Camellia, etc.).

It is quite possible that the causes which bring about these various kinds of double flowers are also diverse, and this being so, it may be of great practical importance to determine what they are. In some cases we say, and rightly, they are hereditary; but this explains nothing, it only implies that there was a time when the structure was different from what it has since become. What brought about the change, and why has it become fixed and hereditary?

Again, we say glibly—but, no doubt, with some truth—that these double flowers are the result of some differences in the conditions under which plants grow—to a difference in the "environment," as it is the fashion now to say. These changes bring about a corresponding alteration in the nutrition of the plant, and so on. All this is true enough, but it is not sufficient for practical purposes. We still want to know how and why. The difficulty of finding out is increased by the fact that we constantly find one plant out of many producing double flowers, or it may even be one flower out of several on the same branch, that is doubled, while all the others are normal, and yet the "environment" is, for aught we can see, unchanged.

Of late years the production of double flowers has been attributed to the action of mites or other insects, to fungi, and quite recently to the influence of nematode worms in the roots. It cannot be denied that such causes may be operative. All that we can say is, that although we are pretty familiar with double flowers in a wild and in a cultivated state, as also with the effects of injury from insects and fungi of various kinds, yet we have never seen any such morphological changes as are exhibited in "double" flowers as a result of parasitic injury. What we do find in such case are pathological deformities in which regularity of conformation is abolished, and more or less shapeless masses ensue, or, as in the case of galls, we find a regular adaptation to the requirements of the insect.—*Gardener's Chronicle.*

SURVIVAL OF DESERT AND ALPINE PLANTS.

Many seemingly inhospitable regions possess a comparatively rich flora and the wonder is, how the various species manage to survive in such places. A hint in the matter is given by Elias Nelson in the *Plant World,* who, writing of the Rocky Mountain plants, says: On the higher slopes great snow banks linger into late June, July, or even into August. Sharp freezes and skifts of snow usher in September. During the few, sometimes very few, favorable weeks, magnificent flowers, gentians and erythroniums, asters and erigerons, pentstemons and delphiniums, spring up and develop into blossom and fruit with a celerity scarcely surpassed by Jack's famous bean stalk. These are the descendants of ancestors that for many generations have succeeded in gradually accelerating the life activities, not into the "pace that kills," but into harmony with a changing environment. On our cold, arid plateaus we see the same conditions and the same processes and results. The examples may be less striking, but even here the forms that survive have had many a sharp lesson.

But no more striking example can be given than is exhibited in some of the interior deserts, the Red Desert of Wyoming, for example, where not the shortness of the season by the scarcity of water is the prime cause of the noticeable haste. In such localities the moisture that falls is principally the snows of late spring. These on melting furnish the water which must carry many of these desert forms to full fruition. The cloudless skies of June bring to maturity many small annuals that spring into life in cool but moist May. More numerous perennials scatter far and wide their abundant fruitage before July's sun bakes completely dry valley, hill and plain. These latter have adopted the storage plan as the best means of securing the requisite speed when the favorable season comes. Rhizomes, bulbs, tubers and roots, often enormous, are packed full of food materials which are converted into immediately available funds to meet the heavy drafts that the rush season demands.

There is perhaps no class of plants that have learned the art of hurrying so well as the generally despised weeds. A cockle-bur and a pigweed rarely fail to mature some seed. Cut them off near the ground repeatedly during the summer, and each time they will put out new branches from the stump. These may in turn be destroyed, till as Autumn approaches you forget about them, but they do not forget their business. When the season closes a few prostrate branches will be found with mature fruit.

That plants, like most people, will not hurry except from necessity, was abundantly in evidence during the field work of the past season. The identical species (various Eriogonums, Senecios, Solidagos and many others), that were in full bloom on the higher plains of more northern Wyoming in late July or August, had reached only the same stage of development by the first of September, in middle Colorado and southward. The contrast was all the more striking, since the Colorado season opens two or three weeks earlier as well as closes as much later.

THE MYSTERIOUS MANDRAKE.

The name Mandrake in America is usually applied to the May-apple (*Podophyllum peltatum*), but the Mandrake of history is a Mandragora and is a native of the Mediterranean region. It belongs to the order Solanaceae and is, therefore, allied to the tomato and nightshade. The mandrake has long been the subject of much superstition.

The root is forked and fleshy, presenting a rude but startling likeness to the human figure. From it the leaves spring with no apparent stem and among them the stalked whitish flower appears. The fruit is a one-celled berry about the size of a sparrow's egg. The whole plant has an unpleasant and narcotic smell, although the fresh berries, when bruised exhale a pleasant odor like wine and apples.

All parts of the plant have poisonous properties like the belladonna, only more narcotic in their nature and for this region the root was often administered before a surgical operation. Plato speaks of it as a soporific, and the people of the east, to this day refer to an indolent person as "One who has eaten mandrake," Shakespeare alludes to this when Cleopatra says "Give me to drink Mandragora, that I may sleep out this great gap of time. My Anthony is away."

A superstition connected with the use of the mandrake as a medicine, is that a small dose makes a person vain of his beauty and conceited but that a large dose makes him an idiot. This popular belief was also recognized by Shakespeare when Banquo, after the uncanny vistation of the "weird sisters," asks fearfully and wonderingly of Macbeth, "Were such things here as we do speak about? Or have we eaten on the insane root that takes the reason prisoner?" In "Othello," he says, "Not poppy, nor mandragora nor all the drowsy syrups of the world shall ever medicine thee to that sweet sleep which thou owedst yesterday."—*California Floriculturist.*

ORCHIDS AND THEIR INSECT SPONSORS.

Prior to Darwin's time the flower was a voice in the wilderness, heard only in faintest whispers, and by the few. But since his day they have bloomed with fresher color and more convincing perfume. Science brought us their message. Demoralizing as it certainly was to humanity's past ideals, philosophic, theologic, and poetic, it bore the spirit of absolute conviction, and must be heard. What a contrast this winged botany of to-day to that of a hundred years ago! The great Linnæus would doubtless have claimed to know the orchid, which perhaps he named. Indeed, did he not know it to the core of its physical, if not of its physiological being? But could he have solved the riddle of the orchid's persistent refusal to set a pod in the conservatory? Could he have divined why the orchid blossom continues in bloom for weeks and weeks in this artificial glazed tropic—perhaps weeks longer than its more fortunate fellows left behind in their native haunts—and then only to wither and perish without requital? Know the orchid?—without the faintest idea of the veritable divorce which its kidnapping had involved.

Thanks to the new dispensation, we may indeed claim a deeper sympathy with the flower than is implied in a mere recognition of its pretty face. We know that this orchid is but the half of itself as it were; that its color, its form, however eccentric and incomprehensible, its twisted inverted position on its individual stalk-like ovary, its slender nectary, its carefully concealed pollen—all are anticipations of an insect complement, a long-tongued night-moth perhaps, with whose life its own is mysteriously linked through the sweet bond of perfume and nectar, and in the sole hope of posterity.

To take one of our own wild species. Here is the *Arethusa bulbosa* of Linnæus, for instance. Its pollen must reach its stigma—so he supposed—in order for the flower to become fruitful. But this is clearly impossible, as the pollen never leaves its tightly-closed box unless removed by outside aid, which aid must also be required to place it upon the stigma. This problem, which confronted him in practically every orchid he met, Linnæus, nor none of his contemporaries, nor indeed his followers for many years, ever solved. Not until the time of Christian Conrad Sprengel (1735) did this and other similar riddles begin to be cleared up, that distinguished observer having been the first to discover in the honey-sipping insect the key to the omnipresent mystery. Many flowers, he discovered, were so constructed or so planned that their pollen could *not* reach their stigmas, as previously believed. The insect, according to Sprengel, enjoyed the anomalous distinction of having been called in, in the emergency, to fulfill this apparent default in the plain intentions of nature, as shown in the flower. Attracted by the color and fragrance of the blossom, with their implied invitation to the assured feast of nectar, the insect visited the flower, and thus became dusted with the pollen, and in creeping or flying out from it conveyed the fecundating grains to the receptive stigma, which they could not otherwise reach. Such was Sprengel's belief, which he endeavored to substantiate in an exhaustive volume containing the result of his observations pursuant to this theory.—*Exchange.*

EXTRACTING PERFUMES FROM FLOWERS.

When flowers are gathered for their perfume, no time must be lost in fixing their fleeting perfume. Flowers are gathered early in the morning, before the sun is high in the heavens. They are then taken into the factory and spread upon the sterilized fat, which has the faculty of extracting the scent. This is done again and again, until the fragrance of as many as twelve pounds of flowers is fixed in one pound of fat. The fat, thus charged with the fragrant essence of the flower, is packed in tins and forwarded to London. The more strongly scented flowers, such as the rose, violet and orange, are treated in hot melted grease, and allowed to cool with it, but in the case of the more delicate blossoms, jasmine, jonquil and tube rose, their petals are laid upon cold fat, spread in glass frames. The scented fat is treated with alcohol 60 per cent. overproof, and kept in a constant state of rotation for three or four days till all the perfume is extracted by the spirit. The spirit is then refrigerated to get rid of the last trace of fat, and elaborately filtered. The perfumes can stand the intensest cold, and are only improved by it, but heat destroys them. Some few essential oils, such as those from roses, orange flowers and the like, are extracted by the aid of heat—distilled in point of fact, but the more delicate and volatile perfumes are fixed by the absorbent powers of fat or grease. The roses of Bulgaria, the lotus flowers of Japan, the violets and jasmines of Southern France come with the lavender of England to attend the chemist's call. Nor is it only from the far famed gardens of the distant East that they come. From the slopes of the Himalayas; from the wave washed strand of the far Pacific come other essences instinct with the life of things.—*Indian Gardening and Planting.*

PLANT NAMES.

An occasional change of language is as exhilarating as a change of air or diet, and herein is one of the charms of rambles off the beaten ways. Sometimes one hears in the current speech of country districts words that in the city are the recognized coin of poets only. Such is the noun "blow" popularly used for a flower in New York State. "Posy," is also an everyday word in parts of Pennsylvania. "What for a posy is that?" is a common question in some sections—a question that preserves a quaint Teutonic idiom in English words, as an insect in amber. In the Adirondacks a marshy meadow is called a "fly," much to your bewilderment if you have never before heard this bit of degenerate Dutch, while in South Jersey a similar place is flatly denominated a "mash." Names of plants are a constant source of interest. In

North Carolina the common laurel is universally dubbed "ivy," and in Western Pennsylvania the wood sorrel, an herb of mountain woods with clover-like leaves that fold at night as though in slumber, is prettily called "Sleeping Mollie." The hand of the arch enemy of mankind is hinted at in the name of many a noxious weed, as devil's grandmother, devil's claws, devil's paint brush, devil's walking stick, and so on.—*C. F. Sanders in Philadelphia Record.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

HORSE CHESTNUTS AS FOOD.—According to recent report, a way has at last been found to utilize the horse chestnut as food. The nut is rich in starch and albumen, and contains some sugar but a certain bitter resin has made it inedible, if indeed, not poisonous as is currently believed. By the new process the nut is powdered and the resin removed by alcohol. The resultant meal is said to be rich in food value, and to have an agreeable taste.

VITALITY OF SEEDS.—The great range of temperature which seeds can withstand without losing their germinating power is remarkable. On the one hand, certain seeds have sprouted after being exposed to a temperature of more than 400 degrees below zero, while on the other, a temperature of 281 degrees above zero did not destroy the vitality of certain seeds exposed to it, in recent experiments,

PRODUCTION OF TUBERS IN THE LABIATAE.—We rarely associate a tuber-bearing habit with species of the mint family (Labiatæ) but half a dozen or more species are known to produce tuberous roots, some of which are edible. The natives of the Soudan make use of the tubers of a species of *Plectranthus* as food and in India *Plectranthus Aromaticus* is commonly known as "bread-and-butter-plant."

AMERICAN TREES IN EUROPE.—European gardeners are coveting the luxuriance of American autumnal foliage and are endeavoring to transplant cuttings of the most vari-colored American trees in their own soil. But thus far those trees which produce the rich purples, crimsons and scarlets have firmly maintained a patriotic determination to beautify only the landscape of their native clime.—*Indian Gardening and Planting.*

THE FRINGED GENTIAN.—Anent that fringed gentian and its reputation for taking French leave of the place where one had found it last year,—I know one station for the plant near Philadelphia to which it has been faithful for eight years, to my knowledge. That, by the way, is the only station for it that I do know —it appears to be a rarity nowadays about here.—*C. F. Saunders.*

NATURAL CHEWING GUM.—In a little book now out of print, Maurice Thompson relates that he once went to school where everybody chewed sweet gum, except the teacher, who chewed tobacco. This sweet gum is an exudation from the trunk of *Liquidambar styraciflua* occuring most plentifully where the bark is injured. It appears in crystal-like drops and after hardening in the air, needs no further preparation for chewing. In its flavor there is a faint terebinthine element, reminding one of spruce gum. Sweet gum is highly prized by Southern children, and was of enough importance to the scientist to become embodied in the generic name of the tree.

PERFUMES AS ANTISEPTICS.—*The Lancet* is authority for the statement that the essential oils are powerful antiseptics, often not very inferior to carbolic acid itself. It is explained that these oils absorb atmospheric oxygen, forming unstable compounds which readily lend oxygen for the work of purification. Turpentine, pine oil and eucalyptus oil are mentioned in this connection and are suggested as accounting for the salubriety of pine and eucalyptus woods. Apropos of this subject, it is interesting to note that in some recent experiments in repressing the omnipresent mosquito, various odors were used with marked success, the principal ones in the order of their efficacy being oil of turpentine, iodoform, menthol, nutmeg, camphor, garlic, pepper and napthalin. The virtues of oil of sassafras in keeping away mosquitos are well known.

CINNAMON FERN FRUITING IN AUTUMN.—In Florida our well-known cinnamon fern (*Osmunda cinnamomea*) has a curious trick of bearing a crop of fruiting fronds in Autumn. According to a writer in the January *Fern Bulletin* nearly or quite one-half the plants in some places show this fall crop of fertile fronds.

THE BARBERTON DAISY.—The Boer war is probably responsible for bringing into prominence a very interesting South African plant known as the Barberton or Transvaal daisy (*Gerbera Jamesoni.*) The plant is not common as yet in cultivation, but is likely to soon become a familiar sight in the flower garden. The flower is described as daisy-like in appearance, often four inches across and bright scarlet in color.

SELF-PRUNING OF WOODY PLANTS.—A few of our common trees have the remarkable habit of forming cleavage planes in their branches whereby certain twigs are cut off toward the end of the growing season, effectually pruning the plant. These cleavage planes are very conspicuous in one of the common aspens (*Populus grandidentata*). Prof. J. H. Schaffner has been looking for these cleavage planes in other trees, and in the *Ohio Naturalist* for January, notes that they occur in the cotton wood (*Populus deltoides*), black willow, white oak, *Rhamnus lanceolata, Quercus platanoides* and others. This self-pruning is sometimes but not always a family characteristic. The common elm (*Ulmus Americana*) and *Ulmus racemosa* possess the habit, but the slippery elm (*U. fulva*) does not. Others trees, among which may be mentioned the wild cherry and hackberry, cut off their fruit spurs in this way, after the fruit has fallen. The willows are very noticeable for this self-pruning habit, and in many species the twigs are often cut off before the growing season is ended and while the leaves are still green.

VALUE OF BOTANICAL STUDIES.—The famous Monravian writer, Amos Comenius, over 250 years ago, gave vigorous expression to the conception of living, objective teachings of the sciences. He said: "Men must be instructed in wisdom so far as possible, not from books, but from the heavens, the earth, the oaks and the beeches,—that is, they must learn and investigate the things themselves and not merely by observation and testimonies of other persons concerning the things." The modern university student of Botany puts his elders to blush by his minute knowledge of some small point in vegetable histology. But he can tell you little of the contents of a country hedgerow, and if you put an unfamiliar plant in his hands he is pretty much at a loss how to set about recognizing its affinities. Prof. Henslow, a famous teacher of botany, was probably the first to introduce into the botanical examination for degrees in London, the system of practical examination. He always held that a man of no powers of observation was quite an exception. He thought and proved that botany might be used "for strengthening the observant faculties and expanding the reasoning powers of children in all classes of society."—*M. E. M.*

TROPICAL PLANTS IN FLORIDA.—It is possible that in the not far distant future, Florida will be noted for several other exotic fruits besides oranges. From a paper read before the American Pomological Society at Buffalo last September, we learn that Southern Florida will grow almost any fruit that can be produced in the West Indies. In Dade and Monroe counties the cocoanut and guava grow wild. That delicious fruit, the mango, takes kindly to the soil, as does also the alligator pear (*Persea gratissima*), which is beginning to be much used as a salad fruit. The date does well in favorable situations, and bananas, lemons, grapefruit and limes are common, of course. Among other and less well known fruits that have been proven easy of culture in proper situations are the pawpaw (*Carica papaya*), the sapodilla or naseberry (*Achras sapota*), the marnwell (*Marninea Americana*), the sour sop (*Anona muricata*), the cherimoya (*A. cherimolia*), and the sugar apple (*A. squamosa*). The apples, pears, cherries and the bush fruits of higher latitudes, however, are missing from the localities that are suitable to these foreigners.

EDITORIAL.

Although spring, according to the almanac, does not begin until some days after the date of this number of the BOTANIST, in all but the most northern of the Northern States, indications of the approach of a milder season have already begun to multiply. It is a rare season when the maples, elms, alders and willows are not showing bloom as far north as New York by the middle of March, and if we are unwilling to class these among legitimate wild flowers, a search along the sunny fence-rows is pretty sure to be rewarded by a few venturesome blossoms of such early species as the hepatica, dandelion, bluet and anemone. April brings the trailing arbutus, the blood root, the spring cress and a few others, and after April the host is too great to number.

In lands where winter serves only as a slight check to the blooming season the inhabitants appear not to possess the desire to hasten forth to pluck the firstlings of the year that animates those in climes where winter is more rigorous and where these early blosoms in addition to their grace and beauty bear the first real promises of a milder season. That it is something more than the beauty of the flowers which attracts us to these early specimens may be seen in the fact that those who rarely go afield for flowers in midsummer may be found scouring the thickets and hillsides at arbutus-tide.

It may be predicted with something like certainty, that among the first of our wild flowers to be exterminated, will be such of these early blossoms as have not a tenacious hold upon life. In the vicinity of cities and towns the arbutus is already doomed, and the bloodroot and Dutchman's breeches seems likely to share the same fate, but it may be doubted whether the adder's-tongue, spring beauty and violet will give up so easily. It is nearly impossible to pull up entire a blooming adder's-tongue, and the stems of the spring beauty are usually too lightly attached to the flat tuber to bring it with them when pulled from the soil. Numbers, alone, protect the violet. Even the farmer with plow and hoe can hardly dislodge them. Let him plow them under and cultivate his crops in their stead, and in autumn he shall find violets blooming again in the midst of his corn field.

While it is a good thing to have societies for the protection of the native plants that need it, it would seem equally desirable for such societies to give us lists of the plants which can do without their help—plants of which we may pull up as much as we please without feeling guilty of thus spoiling somebody's pleasure the following season. The list at best cannot be perfectly arbitrary from the fact that the necessity for protection depends somewhat upon the locality. The white trillium is scattered through some of the remote forests with an extravagance that seems almost wasteful; in other localities it is as rare as an orchid. But orchids are rare only near cities. On the borders of mountain lakes far from civilization, there are often to be found acres of *Pogonias,* and *Calopogons* and the small purple fringed orchis is frequently nearly as common.

There are certain people in every community who must pick flowers if they enjoy their outing, measuring their happiness somewhat by the number of rare blossoms they have been able to obtain. Such people, however, can scarcely be said to enjoy the flowers—they only enjoy picking them. A spray of columbine growing from a cleft in some gray rock, a water lily riding at anchor on the surface of the lake, or the mountain laurel filling the underwoods with a cloud of bloom, have a charm in their habitat that he who removes them vainly attempts to bring with him. The truest enjoyment of the flowers, after all, is to be found only when they nod from their own stalks in their chosen environment.

BOOKS AND WRITERS.

—John Coleman Adams, the author of "Nature Studies in Berkshire," has written a life of the Artist-Naturalist, William Hamilton Gibson, which has just been published.

—The friends of American forestry have reason to rejoice at the unusual number of books on our native trees that are being issued. Within the past year no less than six different books on this subject have been published or announced to be published. The trees stand in such close relation to the daily lives of most of us that we can scarcely have too many books about them. In winter, when frost and snow have banished nearly all the other attractions of the countryside, the trees not only remain excellent objects for study, but assume new phases of attractiveness that were unperceived when their branches were clothed with verdure. New and striking characteristics appear in even the most familiar species, and we run some risk of passing old favorites without recognition. Certain species, there are, that may be easily distinguished at any time of the year, but in winter the majority require for their identification, a greater familiarity with bark, and branch and bud and leaf-scar, than many, save the woodsman, possess. It was, therefore, a happy thought that inspired Annie Oakes Huntington to write "Studies of Trees in Winter." The book contains just the information necessary to enable us to recognize all the native trees of Northeastern America in their leafless condition, but it does not stop with a description of the winter aspects of the trees. All of the interesting or characteristic points about each species are noted and placed before the reader in attractive form. The author's comprehension of her subject is well shown in the following quotation from the section on the hop hornbeam. "There is but one native hop hornbeam in New England, and it is an extremely interesting little tree. It grows under other trees in the forest and is easily overlooked, usually being mistaken for a young elm. Of all trees the hop hornbeam is most retiring in its habits and takes much the same place among trees that the hare does among animals, or the violet does among flowers, living a secluded life in wild places where the woods partly conceal its identity." There are many excellent illustrations from photographs of the trees in winter, and twelve colored plates of twigs and buds give the color characteristics of numerous species. The book is a 12mo. of 200 pages and is published by Knight & Millet, of Boston.

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NOTES FROM OHIO.

BY ALMON N. ROOD.

Last November, in company with a botanical friend, I was exploring a small brook in Portage County, Ohio. We descended a steep bank at the foot of which a hidden spring spread its waters over the surface of the ground and here in the open bog we came across a number of plants of the, with us, very local fern, *Dryopteris cristata.* Though so late in the season that severe frosts had nearly denuded the trees of foliage, yet many fronds, especially the fertile ones, remained green and fresh, so that a number were collected for herbarium specimens. A peculiarity of this fern especially noticeable, was the position of the pinnae, nearly all being situated with the plane of their surfaces at nearly a right angle to the general plane of the frond. *D. cristata* is one of the pleasant surprises that await us occasionally in unexpected places and never fails to attract the attention of the plant lover, its narrow, graceful fronds and rich deep coloring, combining to make it conspicuous among its other plant companions.

On the same date and in another part of the same county I left our buggy to examine a clump of papaw trees (*Asimina triloba*), and in the thicket found clinging to some vines a bunch of purplish black berries which looked unfamiliar. An examination on the return home revealed them as the fruit of the moonseed (*Menispermum canadense*), which, while not by any means a rare plant here, seldom produce fruit in any very noticeable quantity. A bush of *Viburnum lentago* covered with clusters of dark purple, papery fruit, was also found in the same locality and many seeds and berries of more or less familiar plants lent a pleasing variety to the store of botanical "catches" for the day.

The late fall and winter months seem to many botanical students to be devoid of interest, because of the general impression that plants are to be associated only with spring and summer, yet some of the most interesting plant history, i. e., that relating to their seeds and the methods of their dissemination, are best studied during the winter months. One of the most interesting field days I spent last season was during a severe cold spell in the latter part of December when the streams were so frozen over as to make travel on the ice an easy means of access to certain marshy tracts lying at the head of what is known as Beaver Pond. Here, on a typical winter day with a stiff breeze blowing and the snow falling about me, I gathered more seeds of marsh plants from the stems above the snow than I had been able to obtain all the preceding fall. Here, too, I could observe the feeding of numerous small birds upon the various stores thus abundantly supplied by nature and among many one could note preferences for certain kinds, while others more conspicuous, were left undisturbed. What bird feeds upon the berries of *Ilex verticillata?* Though the fruit is abundant and the color so strikingly handsome and alluring, being one of the most conspicuous of bushes in winter when the ground is covered with snow, yet I seldom find birds feeding upon it. This and many other questions concerning the colors of various fruits and berries and their preference by certain birds as well as the means of seed dissemination occurring among various plants in winter, can not help attracting the attention of the careful observer besides furnishing abundant opportunity for field study at a season when there is ample time and inclination for the work.

SPRING IN THE SOUTH.

By Willard N. Clute.

Every locality has its own Spring, or rather, its own phase of spring. The marsh, the sand barren, the river valley and the upland alike feel the thrill of an awakening season, but each responds to the impulse with a flora of its own. And just as the flowers vary in shape and hue from seashore to mountain top, so do they from the equator to the poles. To one like myself, whose rambles have always been taken in the fields and woods of the Northern States, every flower that is now springing in this southern land is an object of interest, and the study of the various features in which they differ from their northern kindred, a most fascinating pastime.

One of the first things to impress the visitor, is the absence, not only of the identical species that make the Northern spring gay, but of any plants of the same family. Arbutus, hepatica, bloodroot, anemone, spring beauty, trillium, adder's-tongue, Dutchman's breeches, Solomon's seal—all these are missing. The composites have a much larger representation than they do further north, although the humble dandelion is not to be found. The sow-thistle is one of the first spring flowers, but this distinction has not relieved it of its weedy qualities to any extent. Thistles of the ordinary kind are blooming, too, but they are of such sharp and forbidding appearance and so much more clumsy than even the northern bull thistle, that I have not felt inclined toward a closer acquaintance. Of other composites with greater claims to beauty must be mentioned a *Helenium* with large daisy-like flowers which spread a yellow light in moist places, and the *Chaptalia,* whose smaller white flowers have the odd habit of assuming a horizontal position with ray-flowers forming a funnel over the disk until ready to open.

Although *Viola* is a genus of the North, there are both blue and white violets here, but I have seen no fields in which they grow in sufficient numbers to give a separate note to the color-scheme. They appear here and there, a few plants at a time, and never very noticeable. Another northern genus, the willow, is but sparingly represented. The principal, if not the only, one seems to be the black willow. The pussy willows would no doubt find this too warm for their furry wrappings. The daisy flea-bone (*Erigeron annuus*) is so common in New York that in spite of the fact that it is of European origin, I had come to look upon it as a typical plant of the northern spring; but here it grows more abundantly than I have ever seen it elsewhere, and with another composite, a species of *Senecio* allied to our golden ragwort or squaw-weed, forms almost the entire noticeable flora in the vicinity of New Orleans. This may sound strange to many until it is known that the city is surrounded on all sides by the gloomiest of cypress swamps. To reach the nearest lands supporting the true southern flora, one must travel at least thirty miles. Only in "the piney woods," as the expression is, can one find flowers worth the gathering at this season.

In every locality there are certain species, which, by their beauty or fragrance, or abundance, attract more than ordinary attention, and stand as a series of floral milestones to mark the progress of the passing year. The arbutus, rhododendron, water-lily, golden-rod, and the witch-hazel at once come to mind in this connection. The first of such species in the piney woods is the yellow pitcher plant (*Sarracenia flava*) which at Easter-tide is at the height of its season. Unlike our northern plant (*S. purpurea*) it does not seek the seclusion of sphagnum bogs, but grows almost anywhere, if the soil is wet. The great yellow flowers are exact duplicates of those of the northern species, in shape, and measure four or five inches across. They do not easily wilt and are frequently gathered for bouquets. The cylindrical leaves, broadest at the apex, are often a foot long and stand nearly erect. From their shape they are frequently called "trumpets," and I find various musical notes can be produced from them by blowing in the right way. I have also heard them called "Indian pipes."

Scarcely less noticeable are the flowers of the butter-wort, butter-cup or bog violet (*Pinguicula lutea*) which flourishes in any moist spot. These bell-shaped blossoms of clear lemon-yellow are singularly handsome, but picking them is not an agreeable occupation, owing to the fact that the scapes are covered with the same slimy exudation that is found on the leaves. It gives one a creepy feeling to grasp a plant whose digestive juices are on the outside. It seems to prey upon much smaller game than does the pitcher plant or sundew. Only tiny gnats were found in the impromptu stomachs which the plant forms by curling over the edges of its leaves.

Here and there among the pines, a change of soil or the shallow valley of a meandering brook gives various broad-leaved plants a foothold and then one is pretty sure to find the dogwood and azale a. The last flowers were falling from these two the first week in April, but others are opening further north, and, in fancy, we can see this rose-crested wave of white slowly passing northward until it breaks across the hills of the Middle States a month later and goes on to spend itself in Canada. With the dogwood blooms the anise-tree (*Ilicium Floridanum*) whose large starry crimson flowers clustering among the dark glossy leaves make the copses good to look upon as we marvel at the laws of Nature which confines this species close to the Gulf and allows the dogwood the freedom of a continent. A good rich crimson is a rare color among American plants and it is all the more surprising in the anise-tree when it is known that this is closely related to the snowy magnolias.

Taken at its best, the southern spring compares unfavorably with the season a thousand miles further north. Flowers there are in plenty, if we choose to look for them, but they are never scattered with such prodigality as they are in New York or New England. I have seen nothing to compare with our fields of bluets, meadows of buttercups, woods of hepaticas or swamps of marsh marigolds. The south is a land of flowers—the number of species is large,—but so luxuriantly does everything grow that the flowers seem lost among the all-embracing green. In June, in the Middle States there comes a lull in the blooming season, this being the season when the spring flora ceases and the summer flora begins. March and April in Southern Louisiana are very much like it; one feels that with so much verdure there ought to be more flowers.

If nature has not done much for New Orleans in the way of flowers, she has only made man's work show the better by contrast. Such pansies as have appeared on the lawns during the past two months, grow only in an equally moist and genial climate. I have never seen anything to approach them in the North. At present one sees in cottage gardens whole rows of red Amaryllis and in waste places clumps of the same species growing half wild. The beds and borders are gay with hosts of common blossoms, and as for the roses, they are so abundant that notwithstanding their beauty, they run some risk of being overlooked and their presence considered a matter of course. Everywhere the China tree is displaying its drooping racemes of lilac-tinted flowers, while the magnolia, casting off its two downy sepals as the bloodroot does, is unfolding the first of its great white blossoms, like a clean page upon which to write the history of the early summer, whose arrival its blooming portends.

USES OF THE PAPER MULBERRY.

The paper mulberry is usually cultivated for ornament in the United States, but in other lands its usefulness is its chief recommendation. The tree is called *Morus papyrifera,* or *Broussonetia papyrifera,* and is closely allied to the common mulberry. It grows wild in China and Japan and also in many of the islands of the Pacific ocean, where the natives manufacture a large part of their clothing from its bark. The most important use of the bark, however, is in making the peculiar whitey-brown Japanese paper with which most Americans are more or less familiar. The manufacture of the paper and some of the uses to which it is put, are thus described in *Indian Gardening and Planting*:

A mulberry plantation resembles very much a grove of our willow trees, the mulberry having a very short thick stem with many branches. In November, when all the important products, such as tea, rice, beans, etc., have been harvested, the Japanese farmer finds time to cut the branches of the mulberry tree. The first operation is to boil these branches in a weak wood ash bath in order to loosen the outer layer of bark. After the latter is removed, the bast is peeled off and thoroughly washed by suspending it in the river. The bast is then dried and sold to the papermaker. In our paper mills the pulp is prepared by grinding almost any fibrous material in the beating machine until sufficiently fine, whereby it cannot be avoided that the fibres are cut short. The Japanese, on the contrary, are very particular about treating the mulberry bast in such a way that the fibres retain as much as possible their original length, and this, of course, is the reason for the excellent strength of their paper. The bast is placed on a flat and level granite stone, moistened with water and beaten with wooden hammers until thoroughly fine. The paper is, of course, made by hand, and by shaking the sieve only in one direction, which is almost the rule in Japan, the fibres place themselves nearly parallel. This accounts for the fact, that the Japanese paper can only be torn straight in one direction, at the same time possessing a remarkable strength in this direction.

In China and Japan paper is a far more important and far more generally used article than with us, owing to its superior quality and strength. The Japanese always has a supply of paper sheets in his sleeve pocket. If he wants a bit of string he twists a strip of paper together. I have had an opportunity in the railway carriage of seeing a Japanese do almost the impossible with a bit of paper string, such as tying up his trunk with the remains of a letter. In Japan, paper not only takes the place of our window glass, but even of our doors and walls.

If the Japanese or Chinese paper is impregnated with Ye-no-abura, the oil from *Perilla ocymoides,* the Japanese substitute for boiled linseed oil, it becomes perfectly waterproof. It is used for making umbrellas and macintoshes. Perhaps it will interest you to know that during my stay in Japan I never had an umbrella or a macintosh. If it happened that I was caught by a sudden shower, and this happened very frequently indeed, I went into the next paper shop and bought a macintosh of oil paper for 2d. (4 cents). The same with umbrellas. If the paper is oiled and varnished, then it takes the place of leather; the roofing of the jinrickshas, the little hand-carriages, is often made of paper, even the Japanese "tab" for rainy weather, the equivalent for our water boots, is made of paper.

FERMENT ACTION IN PLANTS.

Besides our British insectivorous plants, there are other families abroad which include such fly-catching genera as *Sarracenia,* of

North America, and *Nepenthes,* the pitcher-plant of the East Indies, etc. The question arises—How is it that plants of no affinity have acquired this common property? Though it is difficult even to guess how the widely different structures came into existence in each case respectively, we may safely attribute it, at least in a general way, to protoplasm, which is the same in all plants and animals. Hence, whatever the causes may have been which excited it to develop insectivorous structures, it is not surprising to find such in plants of no relationship beyond the common bond of vegetable life bound up in the living protoplasm. We have seen that when any nitrogenous matter is placed upon an insectivorous organ a digestive fluid and an acid are secreted in an exactly comparable manner to the behaviour of our own digestive apparatus.

Now, there are several instances known where this is effected among plants quite apart from truly insectivorous habits at all. Thus, the papaw tree of the West Indies, etc., has large leaves not unlike those of the fig, and pear-like fruits. It has long been known, and, indeed, used for the purpose, that if tough meat be wrapped up in the leaves or rubbed with the cut fruit it becomes tender. A fig leaf will answer the purpose as well. The fact is that the presence of nitrogenous substances stimulates the protoplasm to secret the digestive fluids, and the making the meat tender is really due to what might be called "incipient digestion."

Knowing this common property of protoplasm, Dr. M. T. Masters placed fragments of hard boiled white of egg in the little nectaries of the Christmas rose. After a certain time they exhibited the usual feature of "aggregation" in the cells of the nectaries always seen when insectivorous plants have consumed their prey. This experiment proved that incipient digestion had been set up, though, of course, these honey-secreting organs are not naturally insectivorous at all.

The butterworts derived this name from the fact that they will curdle milk, they are used in Lapland for making a cheese-like substance from the milk of the reindeer. Our common Lady's bedstraw (*Galium verum*) with yellow flowers possesses an analogous property, and has long been used as a sort of vegetable rennent in cheese making in certain places in England. But the secretion of ferments is carried on in all plants quite normally, as a few instances will show.

When seeds are about to germinate the reserve food-materials contained either in the external endosperm (as in a wheat flour) or within the cells of the cotyledons, as of almonds, pears, and beans, consist of solid substances as starch and aleurone or liquid as oil, but in all cases they are unassimilable. Before the embryo can make any use of them they must be converted into a liquid state for absorption. This is done by means of ferments or "enzymes." by which starch is converted into sugar, and aleurone into peptones, etc. A precisely similar process has to be gone through when a potato tuber sprouts, and its starch is to be utilized for growth.

Another case is where secondary roots arise from the mother root. They issue from below, and are therefore called endogenous. They commence as little bulging points which continually elongate till they finally issue out of the surface, raising up the superficial tissues like a collar around them. In passing through the cortex the root makes a hole for itself by *dissolving* the latter in its passage, and at the same time absorbing the nutritious solution for its own purpose of growth. It sometimes happens that the creeping underground stem of couch-grass meets with a tuber or bulb in its course. It does not pass round it as if round a stone, but bores right through the obstruction. In so doing the tip of the stem behaves like a secondary root, and dissolves out a passage for itself.—*The Garden.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

VARIATION IN THE PECAN.—The pecan nuts, so plentiful in the fruit stores, is the fruit of the southernmost of our hickorys—*Hicoria pecan.* The tree is much like other hickorys in appearance, with a rather rough bark, but not so rough as that of the shag-bark. In the wild state there is great variation in the size of the nut, and also in the thickness of the shell. The nut that comes to northern tables usually requires a nut-cracker to open it; but in its native home it is not uncommon to find trees bearing nuts with shells so thin that they can be easily crushed in the hand. When fresh the kernel can usually be gotten out entire.

How Certain Fruits Ripen.—Everybody knows that when the persimmon appears to be ripe it is not always edible. We must wait until time has taken the astringency out of it. The theory is that in fruits of this nature there is present a certain ferment of "enzyme," which gradually makes it mellow and sweet. Other less noticeable examples of the action of such ferments may be found in the apple, quince and banana.

Abrus Precatorius.—This is the name of a pretty climbing plant with scarlet egg-shaped seeds spotted with black, which is said to be coming into favor in American gardens. The plant is native of India, and, according to *Indian Gardening,* goldsmiths there use the seed as the unit of weight, the *ruttee.* The Brahmins and Buddhists use it in the shape of beads for rosaries; hence the specific name *precatorius,* signifying prayer. The leaves and roots have the same properties as liquorice.

The Prickly Pear in Australia.—Australia seems to be a land that offers superior inducements to any plant or animal of other lands which cannot do well at home. A while ago the meek little rabbit was terrorizing the settlers, and now the prickly pear (*Opuntia*) is having the same sort of vogue. So alarmed have the planters become that the Department of Agriculture of Queensland is to offer a substantial reward for the discovery of some means of eradicating the plants. From our knowledge of the prickly pear, it would seem that if the plant spreads rapidly enough in Australia to be a menace to farming it must have greatly altered its habits on going abroad.

The Camphor Tree.—A large number of young camphor trees are growing at Audubon Park in New Orleans, and are of unusual interest to the botanist from their close resemblance to our well-known sassafras. The bark of branches and twigs is of the same yellow-green hue and has a taste and smell not very different from sassafras. No doubt if a person familiar with the taste of sassafras were given a piece of camphor bark to chew without knowing what it was, he would call it sassafras. The leaves of the camphor tree are small, rather oblong and pointed, much more like the conventional laurel leaf. Readers need scarcely be told that both these species are true laurels and in no way closely related to the rhododendrons and kalmias.

PROLONGING THE LIFE OF INDIVIDUAL BLOSSOMS.—A flower is simply a means to an end—the plant's device for setting a new crop of seeds. So persistently do the plants obey the natural law to be fruitful, that simply removing the flowers as they fade will often cause a species to continue longer in bloom. Similarly when pollenation is in any way prevented, the blooms remain upon the plant for a much longer time than usual, waiting in the hope of receiving pollen. Apropos of this a writer in *Park's Floral Magazine,* relates that by removing the pistils from tulips, the flowers remained a much longer time unwithered. This subject is one upon which more light might conveniently be shed, and is recommended to any botanist with leisure. Some of our native wild flowers with good sized pistils would be best for experiment. It would be very interesting to know how much longer flowers from which the pistils have been removed remain open than the flowers not subjected to this treatment, but who knows how long the flowers of a single species usually remain open?

NEW BOTANICAL TERMS.—Little by little the way of the botanizer through modern literature is being made harder by the adoption of new ways of calling old things. In the *Ohio Naturalist* for March, Professor Schaffner proposes several unfamiliar terms. Any specialized part of a branch which bears the sexual organs (usually pollen and embryo seeds) should, he says, be called a gametophore, and that the gametophores may be either antheridiophores, archegoniophores, or oogoniophores. In the new botany, however, "the flower is a modified spore-bearing branch without sexual organs." The flower may be either monosporangiate or bisporangiate (that is, with both pistils and stamens or lacking one of these organs) and the monosporangiate flower may be microsporangiate (staminate) or megasporangiate (pistillate). For stamens and pistils the terms androecium and gynoecium are proposed. The structure which develops when the pollen grain falls upon the pistil is to be called the male gametophyte, while the ovule is the megasporangium. All this may be good enough for the scientist, but it will scarcely impress the flower-lover as inviting.

THE SUNFLOWER AS AN ECONOMIC PLANT.—The first year of the Twentieth Century closed with a curious sale on the Baltic of a cargo of sunflower seeds. Though a small trade has been done in sunflower seed for close on two hundred years, this transaction was the first in which a whole cargo—300 tons from Odessa—was dealt with. In Russia, where the cultivation of the sunflower and the manufacture of oil from its seed is conducted on a large scale, the Grandiflora is the variety grown. The species rises in a slender stalk 5 ft. high, producing one monster head, the average yield being as much as fifty bushels of seed to the acre. So rich is it in oil that that quantity of seed will yield fifty gallons of oil, while the refuse of the seed, after this quantity of oil has been expressed, weighs 1,500 pounds when made into cattle cakes. Few people in England or India who grow the sunflower for ornament have any idea of its usefulness. It is among neglected crops in which there is money, as is shown by the price paid a few days ago. Besides the seed, every other portion of the plant can be utilized. The leaves furnish an excellent fodder, while in Russia the stalks are prized as fuel, and their ashes, which contain 10 per cent. of potash, are readily sold to soapmakers. Naturally, in Russia the chief virtue of the sunflower lies in oil contained in its seed. The oil is of a clear, pale yellow color, almost inodorous, and of an agreeable mild taste, so that it is in great request as a table article. Why sunflowers are not cultivated on an extensive scale in this country it is difficult to say. Poultry and cattle like the seed either in its natural state or crushed and made into cakes. No plant produces such fine honey and wax; when the flower is in bloom the bees abound in it. —*Indian Gardening.*

FRUIT OF TRAILING ARBUTUS.—For every person who has seen the fruit of the trailing arbutus, there are thousands who have seen the flowers; and yet the seed is apparently not very rare, although most botanists seem to think it is. In clumps where the flowers are ungathered, the flowers rarely fail to set seed. The fact that the botanists' attention is attracted in some other direcion when the seed is ripe, probably accounts for his failure to notice it.

THE COW PEA IN THE SOUTH.—The cow pea's botanical name is *Vigna sinensis,* and although commonly called a pea, is correctly speaking, neither a pea nor a bean, and differs widely from both. To be sure, they all belong to the same family (*Leguminosae*), but so do clovers, alfalfa and vetches. According to De Candolle and other authorities it is a native of India and was cultivated there at least three thousand years ago. There is no definite record of its introduction into this country, but it is believed to have been sent from England to the Oglethorpe Colonies in Georgia about 1734. Its value, even in those days of slow travel, must have been speedily recognized, for by the beginning of the last century the plant was common in all settled parts of the South. It is a native of the tropics,is most at home in the Southern States, but by its readiness to suit itself to circumstances it has developed a large number of varieties, some of which fully mature in the short northern summer. Some sorts mature seed within 60 days from planting; others maintain a vigorous growth for six months or longer, even putting forth flowers till the vines are killed by frost. Some are short, stocky and erect in growth, others rapid climbers; while others train along the ground and send out great masses of vines. The seeds vary in size, color and shape; flat, round, oblong, kidney; black, white, red, purple, yellow, striped, mottled; small, medium, large.—*From "The Cow Pea."*

EDITORIAL.

With this issue we mail bills to all who are in arrears for subscriptions to the American Botanist, and as the present volume is nearing completion, we also print in the advertising pages, a list of various books and magazines, which readers can obtain at greatly reduced prices in connection with a subscription to this journal for the coming year. This is the season when the flower-lover begins selecting his out-of-door books for the summer, and since he ought in any event to have this magazine, the only one in America that is printed for the flower-lover, he cannot do better than to order all together. The editor's absence in the South has prevented, in some degree, certain improvments intended for the journal, but these, including a series of illustrated articles, will be begun in the new volume. As we have never failed to constantly improve our publications, we hope the beginning we have made with this one will incline all our present subscribers not only to renew, but assist us in making the journal known to others.

Palm Sunday in New Orleans, brings out an unusual crowd to the Catholic churches, especially in the quarter inhabited principally by the French, Spanish and Italians. Everybody who can, goes to church with fresh green leaves to be blessed, in the firm belief that nothing but good luck will come if they are carried home and hung up in the rooms. At St. Louis' Cathedral there was a great throng, but bunches of bay leaves rather than palms seemed to be the proper thing to carry. Here and there were noted the fronds of a cycad (*Cycas revoluta*), but palms were not abundant. Outside the cathedral several individuals did a thriving business in articles to be blessed, made from the young leaves of the palmetto. These leaves make their appearance; folded up like a fan and if taken before the fan is spread yield twenty or more strips nearly an inch wide and two feet long of a bright yellowish white color. From these, ornamental baskets of various shapes are woven "while you wait;" trumpets that may be sounded are made by winding several strips in funnel shape, and numerous other trinkets, showing considerable ingenuity in construction are to be had for a trifling sum.

BOOKS AND WRITERS.

Those who have the least interest in the mushrooms and puff-balls will find the handsomely illustrated "Mycological Notes," issued by Mr. C. G.Lloyd, of Cincinnati, most excellent publications to have, and not the least of their admirable points is that they may be had without a cash outlay! All Mr. Lloyd asks in payment is the puff-balls, especialls the little ones, from your vicinity, no matter where you reside. In addition he is usually willing to name any specimens that may be sent him. The publications consist of observations on our native species of fungi which the author has "made a note of" in his studies, and as such they are far more valuable than so much information from various quarters that is only guessed at. The nomenclature used is of a common sense kind and the references to other sorts, that appear here and there, cannot fail to delight the average botanizer.

"The Cow Pea" is the title of a 60-page booklet that is being sent free to applicants by the Superintendent of the Experiment Farms, Southern Pines, North Carolina. To readers in the Northern States the title carries little, if any, meaning, but it is far different in the South, where cow-peas, or lady-peas, as they are more familiarly called, form a staple article of food. The word pea, applied to this plant, is decidedly a misnomer for the seeds are much more like beans both in taste and appearance. The food value to human beings is not the plant's only recommendation. The tops make a superior quality of hay, and the roots, by reason of the partnership which they have set up with certain nitrogen producing bacteria are regarded as the very best of mediums for restoring the nitrogen to worn-out lands. Instead of decreasing the fertility of the soil, as other plants do, a crop of cow peas actually increases it!

Professor F. D. Heald, of Parsons College, has just published a "Laboratory Manual in Elementary Biology," for use in High Schools and Colleges which cannot fail to be of great assistance to both student and teacher. The older manuals usually state certain facts about each subject and leave the pupil to verify the statements. In the new manual an opposite method is employed.

The pupil is supposed to be supplied with proper material, and then a series of intelligent questions guides him to what to see and how to see it. In this way nothing is taken for granted and when the course is finished it is impossible for the student not to have a good understanding of structure in both the animal and vegetable kingdoms. The book is divided into two nearly equal parts, the biology of the plant being given equal importance with the biology of the animal. The text properly begins with the lowest forms and progresses to the highest. Reference to any part of the work is made easy by a series of sub-titles. The book contains upward of 250 pages, is bound in green cloth and is published by Willard N. Clute & Co., at $1.25.

In the preface to "Blossom Hosts and Insect Guests," the editor, Eleanor E. Davie, claims for William Hamilton Gibson the honor of being the first American to investigate the methods by which flowers are pollenated by insects. At any rate, Gibson did a great deal of work of this kind and being both artist and writer, gave his observations to the world in a number of charming articles in which text and illustration are delightfully joined. In the little book now before us, all that Gibson ever contributed to the subject, either in the way of information or illustration, may be found with just sufficient additions from the editor to form the whole into a logical exposition of cross-pollenation as effected by insects. The book is primarily intended as a supplementary reader for school use, but it is equally good for other people who wish a guide to still further studies of the devices by which the flowers secure the objects of their existence. The author rightly says in concluding "There are similar mysteries to those we have penetrated concealed within the hearts of many of our most common wild flowers and it is one of the most inspiring fascinations of Nature-study, that while rewarding her devotees with a full measure of her confidence, she still allures them on with an inexhaustible reserve." A supplement to the book contains a list of more than 250 of our native wild flowers with the names of the principal insects that visit each species and the means that are employed to secure cross-pollenation. The book is a 12 mo. of 215 pages, published by Newson & Co., New York. The price is 80 cents.

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PLANT MISNOMERS.

By C. F. SAUNDERS.

The common names of our native plants are frequently names transferred from the Old World. Settlers in this new country, finding here many plants which seemed identical with those they knew at home, would naturally give to such the home names. In some cases these appellatives would correctly designate the plant, but in other instances they would not, for the average tiller of the soil or hewer of wood is not a scientific observer. Thus to quote a familiar example or two, the wild roses of our roadsides and swamps are as true roses as any that Anacreon sung; but the name of wild honeysuckle applied to an azalea is a palpable misnomer which, perhaps, came into being because the azalea is not native to England. When English immigrants saw its pretty flower with long protruding stamens they were apparently struck by some resemblance to the well-beloved honeysuckle of their old home, and named it accordingly.

Not long ago there came under my observation a present-day instance of the latter process of plant-misnaming in respect to the common *Galium triflorum,* which the bookmen call the three-flowered or fragrant bedstraw. One May afternoon, I met in the woods near Philadelphia a man, who proved to be a German, industriously gathering this plant and asked him what he would do with it. He said it was very fragrant when dry and he would use it for laying away in clothes to make them smell sweet, and might also employ it for putting in wine to flavor it. On my asking him the name of it, he said it was woodruff.

Now as every botanical student knows, woodruff is a plant of quite another nature and while common enough in Europe where it is gathered in May for the uses named by my chance acquaintance it is not indigenous to America. It bears a considerable likeness to the fragrant *Galium,* however, so that the comparison of the two herbs by an untrained collector is not unnatural. To what extent the name woodruff for this *Galium* may prevail in our country, I do not know; but the little incident above related was interesting to me as affording an object lesson in one source of plant misnomers.

Philadelphia, Pa.

SOME APRIL FLOWERS.

By Prof. W. Whitman Bailey.

The first few weeks of Spring are proverbially very fickle. After these, however, though the weather is often uncanny, and even "May is so much like Mayn't," things generally so equalize themselves that the experienced wood-lover can forecast almost to a day, the advent of any particular flower.

Emerson used to cite an example of Thoreau's marvellous instinct, that he would say with confidence, "The '*Cypripedium* blooms tomorrow." As a matter of fact it requires no special qualification to assert its coming in the week of the 20th of May. So is it with the *Arethusa* and the painted-cup as well as other vernal flowers.

The writer considers this, so far as wild things go, a fair average year. It started to be precocious but recent cold "snaps" have notably retarded vegetation. Last week we had the pleasure of gathering Hepatica and Dutchman's-breeches in abundance in Westchester, N. Y. The latter charming plant, for some inscrutable reason, avoids Rhode Island, though it goes all around and even far north of us. Up the Hudson Valley it is one of the earliest, as it is one of the most charming of the wild-flowers. We have heard it called "Ladies-ear-drops," a pretty name, but not likely to supplant the homely popular title so vividly suggesting Rip and his lazy companions of Catskill.

The plant is a *Dicentra* or *Dielytra* (as the name became by a misprint), and is first cousin of the "Bleeding-heart" of the gardens hailing from Japan and China. Our plant, though perennial, has a very short period of active vegetation. After blooming in early April, and displaying for a too-brief period its exquisite fern-like leaves, it withers and disappears till another year. Its life is all this long time confined to the small, grain-like bulbs, barely subterranean. The flowers are in racemes on a naked stalk and are creamy white in color. Very curiously constructed, it is the divergent petals, sac-shaped and hollow, that give the plant its popular name. It might be called "white hearts" in distinction from the bleeding *Dicentra spectabilis.*

Both the Dutchmen and Hepaticas love rocky regions. Where I found them this year was on ridges rising from six to eight hundred feet above sea-level, broken and tossed into fantastic forms by ancient convulsions of nature. As I gathered the bonnie gems, reminiscent of happy childhood, I could look far off over Croton Lake, to the distant Highlands and the rolling hills of Connecticut. Surely there is no more beautiful region than Westchester even in surpassing New York!

Another little plant coming up everywhere, is common also here with us, but never the feature that it is in New York. This is the Saxifrage, whose name denotes it a "rock-breaker." Coming up in the interstices of cliffs or cracks of bowlders, it acts very much as does a lichen in disintegrating the minerals and preparing the way for other plants.

The leaves, spatulate in shape, are gathered in a rosette close to the ground. The flowers, small and white, are borne in a cluster at the top of a naked stalk only a few inches in height. When the blossoms fade, the red seed-pods are almost as pretty.

Now comes also the incense-bush, or spice, or fever-bush, a characteristic plant of the season, representing the true laurels. Our so-called mountain laurel, of course, is not a laurel at all. Our spice-bush is cousin of sassafras. Its stem and leaves are indeed spicy to the taste, and are often infused as a simple palliative of fever.

Providence, R. I.

INSECT-CATCHING FLOWERS.

No doubt any one who has given much attention to the plants of his or her locality, will have become familiar with one or more species of the genus *Silene,* commonly called catch-fly or campion, the stems of which have a part of each internode covered with a viscid substance to which we generally find adhering various small beetles, flies, aphides, and, occasionally, even Agrionine dragon flies. It is somewhat puzzling to attempt to determine just what purpose this provision serves the plant, unless, as is suggested by the way we sometimes daub a ring of pitch or other sticky matter about the trunks of our fruit trees, it may be effective in keeping certain insects from climbing up the stems to feed on the flowers.

Throughout the more arid portions of Utah and the adjoining states, we find several species of *Mentzelia.* Some of these have large and beautiful yellow or whitish flowers, and there are two kinds at least which, like the evening primroses, open only towards evening; closing again as the morning sun strikes them, while with other species, the reverse is true. These plants are clothed with a fine barbed pubescence that takes hold of the feet of various small insects, holding them securely. An interesting fact in this connection is, that a small spider of the family Attidæ, a handsome and active little fellow, looking like a fleck of shining bronze, takes up its abode on one of these plants (*M. lævicaulis*), and ambles freely over its leaves and stems looking for captives. This spider spins no web for catching its prey, and it is evident that—so long as it is the protege of the *Mentzelia,* it will not require such a web.

Among the weeds of my garden one year, were profusely dispersed clumps of fox tail grass, having a bristly inflorescence that immediately attracted attention by adhering to one's clothing wherever brushed against. Further notice disclosed that these grasses usually had sticking to them a number of "lady bugs" (Coccinnellidæ), lace-wings (Chrysopa), and other small creatures of similar kinds. An amusing incident occurred one morning as I walked among these grasses: There were plenty of grasshoppers that year, and they were continually springing up from the path in front of me. Suddenly one of them, a large female two-stripe locust, that had not directed her heavy flight correctly, sprang against an over-hanging spike of foxtail. Instantly her gauzy underwings were grasped by the little barbed bristles, and she was abruptly arrested in mid-air. Her weight was sufficient to bend the grass stalk low enough to allow her to get an occasional footing against a spray of weeds, and she continued to vibrate up and down like a child playing see saw, until her struggles detached enough of the bristles to release her, but her wings were a sad wreck.

These few observations all being made in one locality, I have no doubt that many other places would afford numerous and more curious examples of an analogous nature.—*Popular Science News.*

THE WILD GARDEN.

Wild flowers, we are aware, do not appeal with the same intensity to all, and it follows that a wild garden may prove of little interest to many who love flowers, but thinking the subject a worthy one, I have selected it for consideration this evening. A wild garden is not, as many assume, a garden wild, but it is a collection of plants native to a district, planted, arranged and taken care of just as other garden plants are cared for. And a wild garden wild is even more slovenly and deplorable than an ordinary garden wild. I remember an account Prof. Meehan told me some years ago of a visit he made to Mr. Wm. Robinson's place near London. Mr. Robinson was the author of a celebrated book called "The Wild Garden," and the possessor of what was considered an exceedingly fine wild-flower garden. After lunch Prof. Meehan was invited to inspect this garden, and his humorous account of it I shall not soon forget. He told me he did not doubt the plants were there, and that they were all that was claimed for them, but he could not see the flowers for weeds. It is needless to say this is not the kind of a garden we have in mind.

A decade ago it might have been necessary to have directed attention to the fact that a large number of our common wild plants were worthy of place in the garden, and that many of the most beautiful flowering plants were to be found among our native hardy plants.

Now, happily, the study and knowledge of wild flowers has so far progressed that a statement of this kind is no longer necessary. We now have papers and books on the subject innumerable, and in many schools botany is taught. Once, popular wild flower books were few, and persons interested in botany were hard to find. Now the reverse is true.

A wild garden is the best way of studying and knowing plants. By seeing plants grow we become interested and desire to know more. We add to the number and our knowledge increases. In due time we have a respectable collection, and we also have a familiarity with plants which can be gained in no other way. The garden becomes a part of our daily experience, and we may closely observe individual plants throughout their entire existence.

The proper time to transplant native plants varies. The latitude is wide, and success is sure to the observing and the industrious. As with trees and shrubs many prefer to plant in the fall, while others maintain the superiority of spring planting; so it is largely a matter of opinion, or condition, when hardy plants may be moved. For myself, I prefer the fall for hard-wooded plants, and the spring for plants of tender structure. Hard-wooded plants, if moved after the leaves have dropped remain dormant during the winter, and will push without loss in the spring. Ferns if moved in the late fall, if not carefully planted, may dry out, or for other causes may show no life in the spring. I have never had special difficulty in growing any of our native plants. If the laurel or wild honeysuckle be moved during a resting period, and the root fibers be carefully preserved, and when transplanted the soil be pressed firmly about the roots and afterwards properly watered, there will be no halt in the growth, and at the proper season the plants will start as though they were in their original position. The trailing arbutus treated in the same way will respond the same as the laurel and wild azalea.

Soil, it should be remembered, is little more than a material substance, which a plant uses; that light, air, heat, moisture and subservient chemical properties, which a plant has the power of appropriating and assimilating, are always necessary and ofttimes independent of the soil. Keeping this in mind, we may understand more readily the value of drainage for the admission of needed properties and the necessity of a porous soil, which will serve the peculiar needs of a plant. It may then be seen that all the wild plants will not do equally well together, and that for the greatest measure of success both skill and judgment are required.

One of our earliest native plants, and one of the most eagerly sought for, is the trailing arbutus. It usually will be found in flower about the fifteenth of March, though its period of bloom depends entirely upon the season. The buds being formed the autumn previous open at the first appearance of fair weather. The pale pink refreshing flowers may then be found peeping from a mossy bank, or, inconspicuous as they often are, in hiding near the surface, filling the air with fragrance and "Sweeter than the lids of Juno's eyes or Cytherea's breath." It is a prevalent belief that it is next to impossible to transplant arbutus, and numerous cases of failure I have knowledge of. The failure, I think, is due to a lack of attention, or is a fault in the observance of conditions. The arbutus will be found growing on high banks where moisture is abundant and where the drainage is perfect. In transplanting the greatest difficulty is to find a place where the roots may be kept moderately dry. The great secret in transplanting anything is to press the soil about the roots as firmly as possible, and afterward to thoroughly soak with water. After this the plant should be watered only when necessary. It is, of course, useless to attempt to move arbutus after it has started to grow, but by observing the simple rules given, I several times have transplanted arbutus, and in each instance was entirely successful. Once, however, I destroyed a plant which had been growing eight months by giving it too much water.

Almost without exception our common wood ferns do well in a garden. The beauty of our maiden-hair fern, royal flowering fern, cinnamon fern, Christmas ferns, and of a number of our hardy ferns cannot be surpassed; and I doubt if they can be equaled by any of the aristocratic exotics we sometimes see in glass cases. The ferns I have named, if properly planted, are permanent, and from year to year gain in strength and beauty. All do well in good, well-drained soil, and in a partially shaded place. There are other desirable varieties of ferns to select from, among them several rock ferns.

A wild garden well begun will renew itself, and, if I mistake not, will become the most attractive part of the garden. When once planted such a garden is permanent, and daily increases in beauty, which, as the poet says, "is a joy forever," and joys enjoyed "will never pass into nothingness."—*From an article by Edwin C. Jellett in Germantown Telegraph.*

THE INFLUENCE OF THE POLLEN ON THE MOTHER PLANT.

Every now and then we come across cases in which the action of the pollen is traceable not only in the appearance of the embryo plant, as is of course the common order of things, but also in the conformation or color of the ovary, or of the seed-coats, which are parts of the female plant, and not directly subject to the influence of the pollen. The capsules of certain lilies, and the seed-coats of certain peas, and of Indian corn or maize, are among the best known illustrations of this supposed agency of the pollen. We say supposed, for the phenomena are so extraordinary that their explanation is very difficult, and an attitude of scepticism is fully justifiable. Within the last two or three years, however, discoveries have been made which are thought to furnish a clue to the interpretation of the appearances in question.

To make a complicated matter as clear as possible, we may allude to the action of the pollen under ordinary circumstances. The pollen-tube is known to contain the egg-cell, together with certain "polar nuclei" and other bodies. When fecundation takes place, one of the two nuclei of the pollen-tube passes out of the tube into the embryo-sac, and there comes in contact with, and fuses with, the nucleus of the egg-cell, which thus develops into the embryo plant.

But, as we have seen, there are two nuclei in the pollen-tube; one is accounted for as just mentioned. What becomes of the other? The answer to this question has been supplied by Nawaschin in Russia, by Guignard in France, and by Miss Ethel Sargent in our own country. From their researches it appears that, as has already been recorded in these columns, there is a double process of fertilization. Both the pollen-nuclei enter the embryo-sac, one to fuse with the nucleus of the egg-cell, and the other with two "polar nuclei" which form the nucleus of the embryo-sac. From this last nucleus, by repeated sub-division, the "endosperm," which surrounds the embryo and supplies it with food, is developed. According to this, then, not only is the embryo-plant the result of the confluence and fusion of nuclei derived from the male and the female respectively, but the endosperm or the albumen of the seed has a like double origin. Now, it is supposed by De Vries and others, that the occurrence of "Xenia," or the direct influence of the pollen on the female plant, may be explained as result of the influence of one of the pollen-nuclei on the endosperm-nucleus. We do not understand how the walls of the ovary (the pericarp) and the coats ot the seed can be affected by anything that takes place in the endosperm. Mr. Webber is endeavoring to clear up the matter by experiments with maize, which is peculiarly liable to manifest appearances attributable to the influence of the pollen, and therefore observable, not only in the new seeding plant, but also in the parent mother plant. We often come across parti-colored grains in a head or cob of maize, and the late Mr. Laxton showed us many such cases in the seed-coats of maize. Mr. Webber's experiments, so far as they go, support the conjectures of De Vries, and the experiments of Heari Vilmorin. It is needless to do more than allude in passing to the great importance to horticulture of these experiments. An entirely new aspect is opening up before us, from which the horticulture of the not distant future must necessarily benefit.—*Gardener's Chronicle.*

A GIGANTIC GRASS SEED.

At the meeting of the Linnean Society on 20th March, Dr. Otto Stapf exhibited several seeds of *Melocanna bambusoides*, a species of bamboo, which completely upset the popular idea of grass seed dimensions, the giants of which are presumed to be represented by pedigree wheat and maize, in which latter the huge mass of seeds constitutes, it is true, a very substantial fruitage; the actual seeds, however, are comparatively small. In *Melocanna*, on the other hand, in lieu of a spike arm or cylindrical mass of associated small seeds, we have solitary ones, measuring no less than 5 inches in height, by 3 in diameter, a massive pear-shaped body, the size and form of which are as utterly different from our usual idea of a grass seed as can well be conceived. By what evolutionary process this huge solitary fruit has been arrived at, is not clear, but as might be expected, the great store of nutriment embodied is so large a fruit, favours the development of the associated embryo plant to such an extent, that the first product of germination is a robust growth, which practically secures establishment and continued existence. The single seed is thus fully as efficacious, if not more so, in securing reproduction, than a very large number of small ones, and by its greater individual vigor, would probably have an infinitely better chance of survival in a dense, growing bamboo jungle, where small weakly seedlings would be utterly incapable of reaching the light. This, indeed, is probably the key to its genesis.—*Indian Gardening.*

MUSHROOM FOLK-LORE.

The mysteriously rapid growth of the mushroom and its curious tendency to spring up in rings naturally attracted to it in old times much fantastic superstition. A common country belief in

Shakespeare's time was that elves and fairies danced within the rings at nights, and seated themselves to rest between the dances on the dewy cupolas of the plants. In "A Midsummer Night's Dream" Titania, in her quarrel with Oberon, describing to him the rage of the winds because the fairies dance no more, and the "contagious fogs" which they "in revenge have sucked up from the sea," says that as one result of the spiteful flood "the nine men's morris is fill'd up with mud." This "morris" was the dance of nine men, the gnomes, who were supposed, after their Puck-like expeditions of maliciousness to dance with joy in the moonlit meadows, within the mushroom rings. Even in these enlightened days gardeners are sometimes found who believe that the growth of the mushroom is influenced by changes of the moon.—*Indian Gardening.*

NOTE AND COMMENT

WANTED—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

PROTECTION OF WILD FLOWERS IN ENGLAND.—Our cousins "on the other side" are beginning to agitate for a better protection of their rare flowers and ferns. Under the existing law, several depredators have received exemplary sentences but according to the report of the Selborne Society, a meeting of scientific societies at Canterbury in June, will discuss the advisability of additional protective legislation.

WEED LAWS.—The fact that many of our wild-flowers will never require protection is emphasized by the laws that are constantly being made for their repression. In 1891 Minnesota enacted a law making it a misdemanor to encourage the growth of ox-eye daisy, Tennessee made it a misdemeanor to sell or give away Johnson grass, Texas forbid railroads to allow Johnson grass or Russian thistle to go to seed along their rights of way and Wisconsin, included wild barley among noxious weeds which are to be destroyed.

OTTO OF ROSES.—Absolutely pure otto of rose according to an article in *American Gardening* is said to be unobtainable, that in the markets now-a-days being usually adulterated with geranium oil or of guaicum wood. The value placed upon the otto may be understood when it is known that an acre of ground, producing 2,500 pounds of flowers, yields at best not more than one pound of oil.

A WESTERN TUBER-BEARING LABIATE.—The note in the March number in reference to species of the mint family that bear tubers has brought forth additional facts. The editor of *The California Floriculturist* sends us specimens of *Scutellaria tuberosa,* a tiny tuberous-rooted labiate from Los Angeles County, California. It would be interesting to know whether this is the only American mint with this habit.

ATTAR OF YLANG-YLANG.—According to the *Manilla American,* the Philippine Islands produce a perfume that rivals the famous attar of roses. This is the attar of ylang-ylang (*Cananga odorata*) or ilang-ilang as it is sometimes spelled. It is derived from a tree belonging to the custard apple family and the oil is obtained by simple distillation of the petals of the flowers, about 75 pounds of flowers being necessary for one pound of oil. Many more rose leaves are required for one pound of attar of rose. Ylang-Ylang is used as the base for many perfumes, and retails for about fifty dollars a pound.

TWO PLANT-PROTECTION SOCIETIES.—The originators of "the Wild Flower Preservation Society of America" must have great fears for the safety of our native plants to induce them to put a second society for their protection into the field. As competition is the life of trade it is possible that two societies will protect the plants better than one. We wish both all success and offer such assistance as we can give. The board of managers of the society with the long name, is made up of well-known botanists. Mr. F. V. Coville is President and Mr. C. L. Pollard of Washington, D. C., is Secretary. The *Plant World* will be the "official organ."

THE VALUE OF BOTANY.—The importance of the study, as a means of mental discipline, aside from teaching the habit of observation, chiefly lies in the value that must be given to evidence. Facts, often of the must delicate nature, must be weighed to come to a decision. The same process has to be followed, not only by the judge and the statesman, but by those in all the walks of life. Failing to give the proper value to evidence may result in success or disaster, and as far as facts are involved, whatever disciplines the mind for this will be of the greatest benefit in imparting mental habits.—*E. J. Hill, in Plant World.*

A LUMINOUS MOSS.—Taking my way back toward the brook I came to a mass of rocks tilted together in such a way as to form something like a cave; looking down this fissure into the semi-darkness I saw a circle of light about a foot in diameter. Thinking this might be some decaying matter that gave out phosphorescent light, I examined some of it and found I had a very delicate frond-like moss which proved to be *Schistostega osmundacea.* 1 Best, to whom I sent a specimen, put me right as to its luminous appearance, as I had mistaken its light as due to phosphorescence instead of its cells being constructed so as to focus the light rays and then reflect them.—*J. W. Huntington in Bryologist.*

THE GERMINATION OF SEEDS.—Nature has various ways of keeping up the numbers of a given species and one of the most interesting is concerned with the germination of seeds. Some years ago it was shown by careful experiment that the seeds of the homely clot-bur (*Xanthium*) two of which are enclosed in each prickly bur, germinate in successive years, so that if the plant which appears the first year meets with misfortune, there is still a chance for the next year. Of single seeds of other species, it would appear that not all germinate the first year under the same conditions. Some seeds of the partridge pea (*Cassia chamaecrista*) planted in the spring germinated very sparingly, but this year the same bed is producing numbers of the plants without seeds being sown and without having been re-seeded by last year's plants. This shows, apparently, that the partridge peas seeds are in no hurry to grow.

EDITORIAL.

The editor has ended his extended stay in the South, and once more among his books and specimens, is endeavoring to catch up with a sadly neglected correspondence. The interruption due to changing locations is responsible for the lateness of this issue. Future numbers will be out on time as usual.

A writer in the *Botanical Gazette,* reviewing Prof Britton's Manual expresses himself as follows regarding the place the books is likely to occupy: "For the first time, we have a manual presentation of the idea of species applied to the ultimate recognizable segregates of plants. It is now to be tested whether those of ordinary training and experience can determine species in this new sense, or whether the use of a manual must now pass out of the reach of amateurs and be restricted to specialists. For example, can an amateur distinguish the 43 species of *Viola* found in Britton's Manual as he can 18 species found in Gray's Manual; or the 13 pieces of *Sisyrinchium* and the 15 species of *Antennaria* found in the former, as he can two and one species of the latter?"

If by amateur the writer means the novice or beginner the answer to his query is that he most certainly cannot. And the fact that he cannot is much to be deplored. The line between the botanist and the botanizer is beginning to be drawn with no good effects upon science that are apparent. In earlier days the ranks of the professional botanists were largely augmented by those who had first taken up botany as a pastime, but the advent of the new botany has rendered such proceedings obsolete and impossible. The person who is attracted to botany by the marvellous in plant life, the amateur, will now take down his Gray's Manual and go on browsing through field and wood to the end of time, while in a college herbarium will sit the embryo professionals, surrounded by miscroscopes, scalpels, dusty volumes and dead plants, conning the minute differences which distinguish one so-called species from another. It is the tendency of the times and not to be stayed by any protest; but one cannot help wishing that instead of calling all these obscure forms, species, the newer botany had arranged them as sub-species, varieties and forms, under the old familiar species of the past.

The editor of a so-called journal of popular botany objects to the publication of articles on nomenclature, and kindred topics in journals designed for the plant lover upon the ground that they "must be quite incomprehensible to many of its readers." In this we believe he is mistaken. Our experience has been that any beginner with energy and persistence sufficient to master the identification of plants, is quite intelligent enough to comprehend any article on the names of plants, that may be set before him, provided, of course, it is written in language intelligible to educated persons.

BOOKS AND WRITERS

"The Fern Collector's Guide" is the title of a forthcoming booklet by Willard N. Clute which will be issued by the F. A. Stokes Co., New York.

With the June number, *Nature Study*, Manchester, N. H., begins its third volume. The magazine has won a deserved success and its increase in size is likely to add to its popularity.

The late Thomas Meehan, although a prolific writer, published but one book. His scientific papers and letters, however, are being arranged for publication by his son, the present editor of *Meehan's Monthly*. They will be awaited with interest by all familiar with Mr. Meehan's original and practical views upon botanical subjects.

—A. W. Mumford, of Chicago, the publisher of *Birds and Nature*, has begun the publication of a series of photographs of forest trees that will appeal as strongly to the student of trees as Huntington's "Studies of Trees in Winter" do, though in a different way. Mumford's tree pictures are of the forest trees in full leaf and were made by an expert photographer from representative specimens. Besides a photograph of an entire tree, each sheet also contains photographs of mature leaves and of the lower part of the trunk, the latter large enough to show the bark-characters plainly. Accompanying each plate is several lines of text, giving information about the range of the species, its size, bark, leaves and wood characteristics. The photographs are among the best that have appeared and form a very instructive series. Thus far, 24 sheets have been issued, the price of the set being one dollar.

A little volume entitled "Elementary Plant Physiology" by Prof. D. T. MacDougal has just been issued by Longmans, Green & Co. This replaces the same author's "Experimental Plant Physiology" which was issued in 1895 and is now out of print. The present volume follows essentially the same lines as the earlier one, being designed to meet the needs of beginners in physiological botany. The experiments suggested are such as can be made with the simplest apparatus and there are 108 illustrations. One of the best testimonials to the usefulness of this work is found in the rapid sales of the first volume.

Mrs. Parsons' new edition of "According to Season," might have borne any other name, as far as its appearance connects it with the earlier volume. The original "According to Season" was a tiny volume without illustrations but this new one has grown to a size uniform with the author's "How to Know the Wild-Flowers" and "How to Know the Ferns" and becomes a most serviceable book for the lover of nature. There are now thirty-one colored plates reproduced by color photography which are very life-like representations of the plants. Several new chapters have been added and each paragraph now has a margined title. The sub-title of the volume is "Talks about the flowers in the order of their appearance in the woods and fields," but one who reads the book will find that birds and many other things receive a share of attention, the whole making a very attractive and readable volume. It is published by Charles Scribner's Sons at $1.75 net.

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FASCIATION.

By Prof. Wm. Whitman Bailey.

It is not an uncommon thing—especially in wet seasons—to see manifestations among plants of what is technically known as fasciation. The term is derived from the Latin *fasces,* meaning a bundle of rods, such as with the axe, were carried by the victors. To this day we frequently see the symbol in courts of justice.

The technical term as applied to plants might be translated "bundling." It results from the growing together—or coalescence of several or many buds when in their nascent state. This changes the whole subsequent appearance of the plant. Instead of the usual cylindric stem, the axis becomes flattened and assumes a ribbon-like appearance. Even the flowers partake of the distortion, and the leaves are projected on a vertical plane instead of in a spiral. This helps to throw some confirmatory light on the accepted theories of phyllotaxy or leaf arrangement. The old-fashioned flower known as "cocks-comb," is the result of fasciation in a kind of amaranth maintained and perpetuated by seed. Generally the forms would revert in perennials to the race characteristics.

The phenomenon has been observed in a great many species of plants both herbaceous and woody. Thus, the writer has himself seen it in the bulbous and tall butter-cups, in the white-weed, in the cone-flower or *Rudbeckia,* in both the native and introduced *Linarias,* like the butter-and-eggs, and in asparagus.

A very striking specimen of fasciated *Rudbeckia* was sent me this week from Shannock. It was about two feet high, two inches broad in the widest part, but everywhere thin like a ribbon. Instead of the usual conical heads, these become arched in a most peculiar way. Maxwell T. Masters catalogues at least 150 plants which now and then exhibit fasciation. He says it is one of the most common of plant malformations: "Very generally the surface is striated by the prominence of the woody fibres which, running parallel for a time, converge or diverge at the summit according to the shape of the branch. If the rate of growth be equal, or nearly so, on both sides, the stem retains its straight direction, but it more generally happens that the growth on one side is more rapid and more vigorous than on the other, and hence arise that curvature of the fasciated brand so commonly met with —as in Ash, wherein it has been likened to a shepherd's crook."

Providence, R. I.

THE MANDRAKE.

By Bessie L. Putnam.

"A flower shaped like a rose, with petals of waxen white, and such funny leaves." This was the description given by a child of a new plant found in the edge of a cemetery adjoining an old oil town of Northwestern Pennsylvania. On being questioned regarding the chances of its being an escaped plant, she was firm in her convictions that it was wild. We were then on a rocky hillside some two miles from the spot where her treasure was located, there to gather the mountain laurel, with which the sterile hills were covered. And as my own thoughts were concentrating on a plan to view her plant beauty she gave a scream of delight and triumphantly held up a mandrake leaf.

It must be confessed that to one who had played with mandrakes in childhood this unexpected materialization of imaginary camelia-like blossoms brought a tinge of disappointment. But the child guide was happy in her treasure though it was only a leaf, and I,—well, I was glad to be saved the fatigue and ridicule that would have folowed the long walk for "only mandrake blossoms."

And yet the plant is a most interesting one, her picture being, on the whole, not overdrawn. Her comparison was with a single rose instead of a double one, and as for the waxen petals of creamy white, few flowers can boast of more exquisite garb. The entire plant, viewed from the standpoint of the botanist, is of unusual interest, and even the most casual observer admires the blossom and leaf.

It is a perennial, frequenting rich woodlands and roadsides, and known also as May-apple, wild lemon and racoon-berry. The thick, fleshy stems and bright green leaves with their veining of white, are among the conspicuous features of returning spring, The barren stalks are centrally peltate, forming excellent toy umbrellas for the little folks, who quickly improvise dolls to carry under their shade by simply taking a similar leaf binding the lobes down and passing bands of grass around at suitable spaces for neck and belt. The flowering stems are always forked, with leaves lobed and attached near the base. In the fork of the stem is found the single flower on a stem about one inch long.

The flower's outer cloak is cast aside at expansion and may be sometimes seen clinging to the top of a petal. The petals vary in number from six to nine, and there are always twice as many stamens. The latter are tipped with light yellow anthers opening by slits in the side, and contrasting beautifully with the waxen petals. Within is the creamy ovary tipped with a yellow stigma, and so large as to suggest the lemon-shaped fruit into which it develops. The fruit is often two inches long, with a thick rind and an odor suggestive of strawberries, apples, musk melon and pawpaw. The taste is relished by some but to most people it is nauseating. The seeds are clustered on a ridge running lengthwise of the "apple," and by removing the yellowish outer skin the albumen store of food is seen.

The flowers are usually at their best about the last of May in middle latitudes, and are conspicuous among the Memorial decorations. They are of short duration, however, and if rain or dew wet the petals they lose their waxy consistency and become almost transparent. Unfortunately, the odor is anything but pleasing.

Buds opened at various stages of growth suggest some interesting points. If we open one say a week before its time we find the stamens and pistil far advanced in formation, the petals—of no positive necessity to the plant's welfare,—very much shorter. Three or four days later the petals have become about as long as the stamens, and when the flower opens they are fully twice as long. It is as if Dame Nature realized that the stamens and pistil were necessities, and resolved to make them first, and then expend her surplus energyq in the ornamental.

If we dig into the earth at blooming time a new bud will be found near the old one on the strong brown rootstock. Later, as the fruit ripens and the plant dies to the ground this bud, white because deprived of sunlight, will have developed into two tiny leaves perfect in outline and venation; and surmounting them is a tiny flower bud with stamens plainly visible by means of a glass. All are protected by the bract covering noticed in early spring. Other plants make elaborate preparation for the next season, but so exquisite a plant in miniature the writer has never found elsewhere.

EPIPHYTES.

Epiphytes have been defined as plants which live or grow upon other plants without deriving their sustenance from them, and thus they can be readily distinguished from parasites, which absorb their nutriment direct from their hosts. It is much more difficult to draw a line of demarcation between epiphites and terrestrial plants for the latter are sometimes found growing in accumulations of decaying vegetable matter upon trees, and some plants seem almost independent of station if other conditions are suitable. There are, however, many plants whose sole habitat seems to be the bark of trees, and others which are rarely found except in accumulations of decaying vegetation in forks of the branches and crevices of the trunks, and to these the name epiphytes is applicable. One usually thinks of orchids in this connection, but there are many other orders which contain epiphytic representatives, while many orchids are purely terrestrial.

Puutting aside the lower cryptogams, among which epiphytes are numerous, we find that the genus *Lycopodium* is largely epiphytic throughout the tropics. Among ferns several genera are largely epiphytic. Bromeliaceæ is a large Tropical American order containing many epiphytic representatives. Aroideæ also contains many epiphytes, while among orchids we find that a large proportion of the tribes Epidendreæ and Vandeæ belong to this class, in fact they are found almost throughout the tropics where the conditions are favorable. Among dicotyledons we find numerous epiphytes among Piperacæ, Urticaceæ (*Ficus* and *Dorstenia*), various cactid, begonias, several genera of Melastomaceæ many Vacciniaceæ, some rhododendrons among the Eriaceæ, numerous Gesneraceæ and Rubiaceæ (the *Myrmecondia* group among the latter being specially note-worthy), and a few representatives of several other orders.

Although there are many plants whose sole habitat is the bark of trees, the dead bark does not always form the base from which their nutriment is derived. The trees often only serve as supports by means of which the plants raise themselves out of darkness into light. Such plants grow from stem or branches and send down absorptive roots into the soil, some of these roots being of enormous length. Here then is another difficulty in defining the term epiphyte, for these plants are closely analagous to climbing lianas, the difference being that the climber has its anchorage in the soil of the forest floor, and climbs up into the sun and light by means of any support that presents itself, while the other class germinates on the branches, and sends down roots to the soil in search of food.

Many plants might be termed pseudo-epiphytes, for they grow in accumulations of decaying vegetable matter, regardless of situation if the other conditions are favorable. As time goes on particles of inorganic dust collect in the forks of the branches and rents and fissures of the bark of old trees, and these, get mixed with fallen leaves and twigs and particles of crumbled bark, forming a vegetable mould which is an excellent soil for a large number of plants. So much is this the case that plants which are normally terrestrial are often found in such situations. It has been well said that Nature has very few unoccupied places, and these plants have established themselves there because the conditions are favorable.

The plants which we are particularly speaking of are largely tropical and sub-tropical. In cold regions the plants that grow in the mould of the bark are for the most part mosses, liverworts and lichens, but in the tropics such situations form the rallying ground for a host of ferns and flowering plants. Small ferns are so numerous as to wreath the trunks, and with these are found Aroideæ, Orchids, Bromeliads, etc. It has been remarked that the Bromeliads chiefly ornament the forks of the trunks, while Orchids, Dorstenieæ and the various species of *Rhipsalis* grow on the upper surfaces of branches that ramify horizontally, while Aroidæ and begonias take root for the most part on the surfaces of high erect trunks.

The bark itself, that is the cortical layer, dead, but not yet crumbled and mouldered into dust, forms a nutriment substratum for a series of plants of various affinity—lichens, fungi, mosses, and higher plants. Even in the case of tropical orchids growing on a substratum of bark, if the roots are forcibly detached, little fragments of the bark will be found torn off with the rhizoids at the places where they issue from the stems. The majority no doubt nestle in the mould-filled crevices in the bark, and nourish themselves, besides, by means of special aerial roots which hang down in white ropes and threads, like a mane, from the places where the plants are situated. Some of these roots are flattened, and adhere firmly to the bark with their flat surface, like the roots of *Phalænopsis Schilleriana*, and on the under surface, behind the growing point, is a whitish fur, consisting of short, thickly packed, absorptive cells, and these adhere so tightly that it is often easier to detach small pieces of the bark than the root itself. Similar conditions have been observed in the roots of many other epiphytes. A curious fact has been observed in conection with these plants, namely, that when transferred to loose earth, devoid of humus, they languish, because their roots are unable to enter into union with a support of such loose texture and this is true of most tropical Orchids that live upon bark. It has also been observed that the seeds of such orchids do not germinate on a loose substratum, but when on the bark of a tree they germinate, and develop into healthy plants.—*Orchid Review.*

A NEW BOTANICAL SOCIETY.

The wish often expressed by plant students that we might have a national botanical society democratic enough to admit to membership any who are interested in botany, is likely to soon be gratified. The preliminary steps have been taken toward the organization of such a society and if the enthusiasm of those who have already joined is any criterion, there will be a large number of members before the end of the year.

The new society will be called The American Botanical Club, and its object will be to further the study of plants in every way possible and especially by correspondence. The interests of the beginner will be looked after, and for those who desire it there will be abundant opportunities for exchanging seeds, living plants and herbarium specimens. A proper sentiment for plant protection will be fostered, and members will be aided and encouraged to cultivate the rarer species for study and observation. Specialists in various branches will name specimens for members, free. The crowning feature of the work will be the publication of the knowledge gained from these studies.

The constitution of the Club is being modeled after those which have made the Fern Chapter, and Moss Chapter so successful. The committee having this work in charge consists of Edward C. Jellett, Philadelphia, Pa.,, Chairman;J. C.Buchheister, New York, Secretary-Treasurer; Frank A. Suter, Lancaster, Pa., and Willard N. Clute, Binghamton, N. Y. Membership will be open to any botanist of good character, whether professional, amateur or beginner. Already the Club includes members of the Torrey

Botanical Club, Gray Botanical Chapter, Fern Chapter and several others.

Members will be kept informed of what is going on in the Club by a monthly bulletin free to members. This will doubtless contain various notes and observations by members. Longer articles will probably be published in the *American Botanist.*

The charter will remain open until August 16th, and every flower-lover who reads this notice is cordially invited to become one of the charter members. The dues for the first year will be twenty-five cents, and those who wish to join should send this amount with their name and address to Mr. J. C. Buchheister, whose address until the charter closes will be Griffin's Corners, Delaware County, N. Y. After August 16th application for membership should be made to the officers whose names will be announced later.

THE GINSENG HUNTER.

It is back in the hills, far from the madding trolley gong, that you meet now and then a ginseng hunter. It may be he sees you stoop to a plant, and a fellow-feeling prompts him to acquaintanceship; or perhaps he drops in upon you as you are weathering a shower in some wayside shack, and fellowship in adversity, makes, for the nonce, of you twain one. Not that he divulges at once the fact of his vocation; by no means, for ginseng is the most select of roots, and sells dried for about $3 a pound. He tests you in half a dozen ways, as a trout a suspicious worm, before, assured of your trustworthiness, he shows you one of the precious forked roots, and bites into it for love of its warm, spicy flavor. Like poet and fisherman, the ginseng hunter is born, not made. At his best he is kin to Thoreau's famous visiter at Walden Pond—that true Homeric or Paphlagonian man. He loves the wild life of outdoors for its own wild sake, and all elemental things—the sunshine, and the wind, the low flying mist, even a dash of rain; uncultured though he be, there is that in him which responds blindly to the solemnities of the still deep woods, where the rare plant of his seeking spreads its palmate leaves and nurses its family of small red berries. With the ginseng of the books he has no acquaintance; what he knows is "ginshang," but this so familiarly that he has even verbalized it, and speaks of its quest as "goin' ginshangin'." He will spend days in contented search for it, faring dinnerless if need be, and sleeping out in the open, until his pockets, packed and bulging, he returns to his home, lays his spoil on the garret floor to dry and takes up again the thread of his village life. As other men go fishing, he goes "ginshanging."—*C. F. Saunders in Philadelphia Record.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

ORIGIN OF THE NAME "BUCKTHORN."—According to *Meehan's Monthly* the word buckthorn, was orginally box-thorn.

THE SENSITIVE PLANT AND ETHER.—It is stated that a sensitive plant placed under a bell glass with a sponge soaked in ether promptly goes to sleep just as an animal would under the same circumstances.

A BOTANIST DEFINED.—According to a South African journal "A botanist is a scientific man who has had a university education; he is very seldom a good amateur gardener; his time is mostly occupied with plant mummies, and is a most useful man to the gardener and nurseryman in giving names to plants, and to the State in settling all questions of plant life."

DEATH OF WM. H. MCDONALD.—Wm.H. McDonald, General Secretary of the Gray Memorial Botanical Chapter, was struck by a train at Elizabeth, N. J., on June 12th and instantly killed. Mr. McDonald was a most enthusiastic botanist and did much to build up the society of which he was the secretary. His loss will be felt by a large number of correspondents.

ORRIS ROOT.—It will probably be new to many to learn that the "orris root" of commerce is the rootstock of an iris (*I. Florentilna* The plant is easily cultivated in the garden and is frequently planted for the flowers of lavender and white.

THE SHASTA DAISY.—One of the best illustrations of what can be done by careful breeding of plants is found in the shasta daisy which is now attracting the attention of gardeners. The flower which is much like the common daisy in general appearance is stated to be often twelve inches in circumference, with three or more rows of pure white rays. These flowers have been produced by crossing the common daisy with European and Japanese species. When the proper strain was produced, careful selection did the rest.

SENTIMENT AND PLANT PROTECTION.—A circular recently sent out by one of our societies for plant protection speaks of "the sanctity of plant life." Such sentiments may be all very well when some beautiful orchid is in mind, but if the society really wants to make itself solid with our agricultural population, it had better cease operations on this line and make application at once for a permanent injunction against the Canada thistle, oxeye daisy, quack grass and various others of the vagabond brotherhood.

THE SOUTHERN DANDELION.—I must tell you the dandelion is to be found in Florida but it is in miniature. You would perhaps have to put on your "specs" to see it. The blossom is less than one-half inch across as I have found them. Wish I could have had you with me in the depths of a hammock in Florida where the sword ferns (*Nephrolepis*) of several varieties we growing with a wealth and luxuriance that was marvelous.—*J. Yates Peck, Hudson, N. Y.* (Probably the Florida dandelion found by our correspondent is the little *Adopogon* which occasionally gets as far north as New York.—Ed.)

COMPOSITION OF PLANTS.—The whole realm of organic things contains practically only four substances—carbon, oxygen hydrogen and nitrogen. The myriad and bewildering variety of organic products, the substances of our bodies, the odors of the rose, the leaves of the forest, the appeasing delicacy of fruits, seem no more than these four substances put together in differing ways. Nay, analysis shows that the most astonishing variety of things can be made up of identically the same number of atoms of each element. Starch and cotton, to take a striking example are made up of the same proportions of the four organic elements.—*Harper's Magazine.*

COMMON NAMES OF ERYTHRONIUM.—When all the facts are summed up, it will probably be found that the spring flowers have the greatest number of commonnames for the reason that the great mass of the people are more often attracted by these early flowers. The yellow adderstongue has its share of these common appellations from "Trout lily" proposed by Burroughs to that of dog tooth violet known to everybody. A writer in *Success with Flowers* speaks of the flowers as "fish-hooks" and in Pennsylvania they are occasionally called "yellow hookers." It would be interesting to know how the idea of a hook has been connected with this plant.

HOST PLANTS OF THE DODDER.—Here at home I have a "wild garden, "partly for amusement and partly for experimenting in so far as to find out if some of our wildlings may successfully be transplanted. Among these latter are several species of golden-rod and the dodder (*Cuscuta gronovii*) runs riot among all the plants, but never a single golden-rod is chosen as host. Its predeliction seems to be the Jewel weed (*Impatiens*) and any or all the *Eupatoriums.* Some seasons I find the nettle also embraced, but not always; why not, I have not been able, so far, to determine. *Cuscuta arvensis* and *C. polygonorum* seem to love the clovers and other low growing field crops, such as our common flax, and makes trouble in harvest time.—*Max E. Munte.*

USE OF ETHER IN FORCING FLOWERS.—The forcing process, by which the florists are able to give us flowers of various kinds much earlier than they would naturally bloom, has recently been revolutionized by a remarkable discovery in the use of ether. The dormant condition of plant life in winter is roughly analogous to the sleep of animal life and the florist simply wakes the plants up ahead of time. The plants, however, if awakened too soo do not readily take up active life again as many have found who have tried to force any of our native flowers at Christmas time though they bloom freely enough a month or so later when they have finished their naps. The use of ether in the forcing process seems to put the plants to sleep not only earlier but so soundly that they are soon ready for another season of growth. If a quantity of ether be liberated beneath the branches of a bush or shrub in July or August, the leaves will at once wither and fall, exactly as they do in autumn and the plants will soon be ready to bloom again. In the usual practice the plants to be forcd are placed in airtight boxes when being subjected to etherization. Fifty-four hours of this treatment is sufficient and the plants may then be placed in a hothouse and treated as ordinary plants are. The important point is that these etherized plants developed so rapidly that they are in bloom before the buds have begun to swell on plants of the same species not treated thus. Twelve days of forcing has brought some of these etherized plants into full flower.

Origin of Potatoes.—If botany was not so serious a business, the facetitiously inclined might be led to remark in view of the many offices that bacteria are found to have in the roots of plants, that bacteriology is rather being run into the ground. One after another, certain ferns, palms, pines, heaths and others have been found depending upon these minute underground organisms, much to the surprise of us all. But close after these discoveries comes one still more surprising to the effect that the common white or Irish potato is also due to the agency of bacteria. It may be said that this, as yet, can scarcely be regarded as absolutely certain, but all the evidence points in that direction. The plant is a member of the nightshade family and like the other species able to reproduce itself by seeds. Then why these vegetative bodies in the earth? It is also pointed out that potatoes are not produced as soon as the plant commences to grow, and that when they are, they are formed of what are regarded as arrested branches—somewhat analogous to the way in which the "apples" are formed on the Azalea. Other nightshades have not the tuber-bearing habit. If the potato is likely to be due to a specific microbe, then almost certainly the tubers of the ground nut (*Apios tuberosa*) must be placed in the same class, and probably the artichoke (*Helianthus*) also.

THE POISONOUS PRINCIPLE IN RHUS.—Several attempts have been made to isolate the poisonous principle of the poison ivy (*Rhus toxicodendron*) and poison sumac (*R. venenata*) and the resultant failures have given ground for the belief that it is a volatile substance difficult to secure. Later, an experimenter attributed the poisoning to a volatile acid which he named toxicodendric acid. Still later researches go to prove that the real poison is an oil which is known as "toxicodendrol." The oil is found in all parts of the plants and at all seasons of the year. Even the hairs of the leaves under the microscope may be seen to contain oil. The popular idea that the plant is most poisonous when in bloom may thus possibly have some foundation in fact, as the pollen might be carried for some distance by the wind. It is difficult in this case, however, to understand why the nose and throat are not more frequently affected. Toxicodendrol is insoluble in water, but readily dissolves in alcohol, ether, chloroform, etc. It is poisonous in the minutest quantities. In one instance the one-thousandth part of a millegram in two drops of olive oil was effective. The oil is not volatile. The time necessary for it to take effect after reaching the skin, varies from 18 hours to nine days. As the oil forms a nearly insoluable precipitate with lead acetate, the best remedy is seen to be the well known one of washing the affected parts with an alcoholic solution of lead acetate. The article from which these facts are drawn was published in *Rhodora* for March.

EDITORIAL.

That anyone is content to rest after merely learning the names of the flowers, is not much to his credit, and if after learning these names, he turns his attention to the petty differences between tweedledee and tweedledum that bother our namenclaturists, he will be in a scarcely more enviable position. The greatest and most enduring pleasures to be derived from an acquaintance with plants is, without question to be found in studying them as living things; in observing their development from day to day, from the expanding leaf and unfolding flower through all the life of processes to the ripening seed. In fact this is the one phase of botany that increases in interest the longer we study it. There are many among us wise in the lore of plants but not one that knows all that may be known of even the commonest species. One needs no great library or extensive herbarium, for such studies. The woods and fields will be his work-shop or if bricks and mortar keep him from this the back-yard in the town, or the window ledge in the city will be large enough to contain the materials for his work. The AMERICAN BOTANIST was founded for the encouragement of studies of this kind, and all the matter that has gone into it has been selected with the idea of furnishing information of value of the student. In a journal of such character, it is manifestly impossible to publish all original matter, for no single publication can expect to "corner" the stock of interesting notes or bright ideas and we venture to assert that in thus giving a review of all other botanical publications, we have not only made two volumes that will remain of pertinent interest and value but two which will compare very favorably with much more pretentious magazines.

Some time ago we promised that as soon as our circulation warranted the magazine would be increased in size. We now take pleasure in announcing that every number of Volume III. will contain twenty pages. How soon we shall again increase the size depends entirely upon our subscribers. Each one is virtually a stockholder in the magazine and while he is not repaid in money for his assistance in advancing its interests, the dividends he receives in the way of a larger number of pages should be equally satisfactory. On another page we offer two subscriptions for $1.40. This is practically offering to pay sixty cents for a single subscription. In renewing be sure to send one new subscriber and thus get your copy for forty cents.

One of the important features of the forthcoming volume, will be a series of keys, based upon color for the identification of the wild-flowers, the first of which is expected to appear in the July number. These keys will be illustrated by drawings of the flowers named, and arranged much as are the keys for identifying the ferns in the editor's "Our Ferns in their Haunts." The reprinting of interesting notes and articles from other publications will be continued and readers are assured that by subscribing to the AMERICAN BOTANIST they will miss nothing but the technical papers in other journals. At the same time we desire to state, that the extra pages we are adding will be devoted to original articles and we request contributions within our scope from all our readers. The use of illustrations when desirable will make the new volume of still greater utility.

BOOKS AND WRITERS.

The *Junior Naturalist,* a publication "devoted primarily to the young naturalist," is announced to begin publication in August, at Chicago.

Time was when the flower lover was perplexed to know where to find a book to identify his finds; now his perplexity arises in trying to select the best one from the growing number of popular botanical works. The botanizer who can afford it will have them all; others can get along very well with a smaller number. While all these "popular botanies" have for their aim the introduction of the plant world to the nature lover, their different ways of approaching the subject leave wide scope for individual choice in the matter of a hand-book. F. Schuyler Matthews' "Field-book of American Wild Flowers," has to recommend it, the fact that it is small enough to slip into the pocket although it illustrates nearly 200 of our native wild flowers and describes several times as many in a way that enables the average botanizer to pick out his plant at once. There are 24 colored plates and the others face the descriptions of the plants which they illustrate. The families are arranged in the Engler-Prantl sequence, and the descriptions pay especial attention to the time of blooming, the color of the flowers, and the insect which assist in cross-pollenating them. Mr. Matthews' artistic instincts will not let him agree with the prevailing ideas of color and he says "In botanical and ornithological works we find such color names as fuscous, rufous, vinaceous, ferrugineous, rose-purple, greenish-purple, etc." They mean nothing to one who is not a scientist and I half suspect they mean little to one who is. Purple (botanically speaking) is a dreadfully abused term which is made to stand for half the rainbow. As an actual fact it is fairly represented by *Mimulus ringens* and one jot to the right or left of that line is *not* purple. Pure yellow is perfectly represented by *Oenothera biennis.* Blue in its pure form only exists (dilutely) in *Myostis.*" Readers may therefore expect to find new but more correct and definite color names given to even well-known blossoms. As to nomenclature, he says: "From what I know of the so-called Rochester code, I should say it is a disturbing influence among already agitated conditions and its lack of consistency does not entitle it to unreserved acceptance." The book has a great advantage over others of its class in its portability. The illustrations are very characteristic but it seems to the reviewer, that reference to the book would have been much facilitated by a simple key to the species. The book is published by G. P. Putnam's Sons, New York, at $1.85.

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FOR THE PLANT LOVER

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THE AMERICAN BOTANIST

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BOTANICAL NOTES FROM THE PHILIPPINES.

By BOYDEN NIMS.

Judging from illustrations of the plant one would naturally suppose that the Cocoanut palm does not bear until it get to be fifty or sixty feet high and then only six to twelve nuts at a time, but I have seen trees bearing nuts that could be reached by a man standing on the ground and I find that about thirty is the average number of mature nuts on a tree at one time, besides innumerable smaller ones. In addition to the nuts a valuable product of this tree is the sap from which an alcoholic beverage is distilled. The sap is collected by making an incision near the bud and hanging a joint of bamboo beneath to receive the exudation. Something like an acre in extent of the grove is tapped at a time, the different trees being connected just beneath the bottom leaves by bamboo poles so as to facilitate the emptying of all the bamboo pails by climbing only one tree. Two men work together collecting the sap. One climbs the tree and lowers the pails with a small rope and the other empties them into a larger receptacle, usually an earthenware jar. The shells, the outer husk and the the dead leaves of cocoanut are used for fuel, the shell being almost equal to coal for that purpose.

Besides the cocoanut there are a dozen or more palms common here, among them *Areca catechu*, a tree about eight inches in diameter and forty to fifty feet high that bears an orange colored fruit about the size and shape of a hen's egg containing a single seed, which is cut into slices and chewed by nearly all Filipinos the same as is tobacco by the Americans.

Growing among the cocoanut trees are various other trees and smaller plants including chicos, mangoes, bread fruit, guaves, langoles, cacao, bananas, oranges, limes, grape fruit and other fruits with which I am not familiar.

A peculiar thing noticed about all mango trees is that the limbs bear innumerable scars made by bolos, the natives probably believing that such treatment will cause them to yield more or a better quality of fruit. Oranges here are very small with thin tender skins that are easily removed without the aid of a knife or other instrument. They are eaten before the skin turns yellow and are very sweet, but not so juicy as those grown in America.

A dozen or more varieties of bananas are common, including the short, thick red ones that occasionally reach the United States from the West Indies. Some are eaten only raw, some only cooked, while others are good either cooked or raw. Some grow on trees four to five inches in diameter and five to seven feet high, others on trees a foot in diameter and thirty or forty feet high. The flesh of some is pure white and others a deep yellow. There is also a wide difference in the size, shape and flavor of the various varieties.

There seems to be no effort toward cultivating any of the fruits or vegetables of the Islands so as to improve their quality as is done in Europe and America. Farming is done here in a very primitive way, with the crudest of implements and on an extremely small scale. I have never seen a field of more than a couple of acres and none under a high state of cultivation. Most crops are simply planted and allowed to grow and mature as best they can.

Sweet potatoes, lima beans and some other vegetables raised in the United States grow wild over here. Gourds, squashes, pumpkins, cucumbers, watermelons and corn are cultivated after a fashion. Watermelons are small and insipid. Filipinos gather their corn after the husk has commenced to dry and roast on the cob over coals of fire at the markets and on the streets. I have never been in either the tobacco or the cane producing sections of the Island, but have seen both growing in gardens.

The natural order myrtaceae is well represented here, there being several species of *Eucalyptus,* including *E. globulus,* which was probably introduced from Australia, as I have not seen it outside of Manila. There are also several of *Eugenia,* including *E. malaconensis,* a tree about the size of our apple, which bears an edible fruit resembling very much our prickly pear in size, shape and color.

The mallow is another very large family and is represented by herbs, shrubs and large forest trees. An interesting member of it is a slender climber covered with delicate spines, deep cleft leaves and a bloom resembling very much that of our cotton. Another is a tree that gets to be nearly one hundred feet high and bears a five celled pod that opens like cotton and contains about thirty seeds, the size, shape and color of those of cotton. They are covered with lint of fine texture, but only about one-half inch long and not so strong as that of cotton. Most of the large trees seem to belong to the bean family and to this class belong most of the shade trees in the streets and parks of Manila.

Besides the large green bamboo used for buildings and various other purposes, which get to be four or five inches in diameter and about seventy feet high, there is another species, probably introduced from Japan, which is only two or three inches in diameter and twenty or twenty-five feet high. It is bright straw colored with some internodes, having one to six dark green stripes about a quarter of an inch wide, which gives the plant the appearance of having been painted.

Another interesting plant, probably a native of Japan, also is *Cananga ordorata*, from the flowers of which is made the perfume Ylang Ylang. There is a grove of them about two miles from Manila and a few trees in most of the public and private grounds of the city. The tree grows to the height of fifty feet and bears numerous flowers with six slender yellow petals about two inches long. The fruit resembles our papaw in shape and structure but is smaller and purple in color.

There are several species of fig here, but none, strange to say, of *F. carica* and none that resemble it very closely. Another member of that family, however, *Artocarpus incisa*, looks very much like it, especially the foliage at a distance of a few yards. The leaves of two species of fig are used by the Filipinos as a substitute for emery paper.

Two members of the Araceae wild here are a large climber, seen in nearly all conservatories in the United States, and *Caladium*. Here are some measurements I made of a specimen of the latter: Entire leaf, blade and petiole seventeen feet, tip of leaf to apex seven feet, blade four and one-half feet across, flower stalk eight feet high, spadix one and one-half by seven inches, spathe when pressed open, one by one one-half feet. A smaller species of this plant is grown for the bulb which is a common article of food here.

Manila, P. I.

SOME VERMONT PLANT NAMES.

By C. F. Saunders.

In the course of a recent trip through the Green Mountain region of Vermont, I noted several plant names current among the people, which I do not find given in the books. In the hope that they may prove of interest to readers of The American Botanist, I append them here.

Rudbeckia hirta, bull's eye daisy; an interesting variant of oxeye; a common name of *Chrysanthemum leucanthemum.*

Malva moschata, musk rose; an instance of the survival of the ancient use of the word rose, which far from being confined to the genus, *Rosa,* was extended in its meaning in old times to flowers in general. Similarly the word violet was used by ancient writers to include many plants of different sorts.

Vicia Cracca, wild pea; from its pea like fruit. This plant I found so abundant in some fields as to give them the appearance in July of being blanketed over considerable areas with purple sheets. The farmers seemed to think the presence of it improved the hay.

Brassica Campestris, kale; probably a survival of the word applied in England to other species of *Brassica,* a variety of cabbage being the best known.

Danthonia spicata, June grass. This grass appears in great abundance in grass fields which have been allowed to run out of cultivated stocks, and makes a fair hay if cut in June, whence the common name.

Rubus odoratus, mulberry, also thimbleberry. The latter name, also applied in some sections to the black raspberry, is obviously suggested by the form of the fruit, but how mulberry should become attached to this plant is an enigma. One man told me he thought the leaf had perhaps suggested a relationship to the mulberry.

Onoclea sensibilis, polypod or polypod brake. This name appears to be universal throughout Vermont, but I am completely at a loss to account for it. Perhaps some reader of this can throw light on the origin.

Osmunda cinnamomea, Buckhorn-brake; for what reason is not obvious, but possibly the woolly stipe has suggested to some rustic imagination the velvety covering of a buck's horn.

Pteris aquilina, hog brake; because, I was told, the young fronds are eaten by pigs. The word brake, meaning fern in general, is I believe in common use throughout rural New England, as well as much of New York State, and is no doubt an inheritance from the speech of old England, where in some countries, according to a writer quoted in Britton and Holland's Dictionary of Plant Names, the word fern was formerly not understood. This is analogous to the state of things in the Green Mountain region, where the term fern, if comprehended at all, is looked upon as a "citified" expression. Both brake and fern, however, are found in Anglo-Saxon in forms little different from their present day readings.

Philadelphia.

THE AMERICAN BOTANICAL CLUB.

The American Botanical Club is now fully organized and in the last thirty days has more than trebled its membership. In October the first annual election of officers will be held. The officers appointed to serve for the rest of the present year are as follows: President, Willard N. Clute, Binghamton, N. Y.; first vice-president, Charles C. Plitt, Baltimore, Md.; secind vice-president, Edw. C. Jellett, Philadelphia, Pa.; secretary, J. C. Buchheister, Griffins Corners, Delaware County, N. Y.; treasurer, Frank A. Suter, Lancaster, Pa.

In order to be of the greatest usefulness, the club has established an advisory council, consisting of specialists who will help students name their puzzling finds. Mr. C. G. Lloyd, Court street, Cincinnati, Ohio, will name any specimens of puff-balls, earth stars, birds-nest fungi and allied plants that may be sent him, and if members of the club who are interested in such things, will send him their names he will be glad to send them some of his own publications on the subject. Mr. W. C. Barbour, Sayre, Pa., will name specimens of hepatics or liverworts. Prof. John M. Holzinger, Winona, Minn., has agreed to name mosses and Willard N. Clute will identify the ferns. Mr. James A. Graves, Susquehanna, Pa., will assist members in naming the sedges. Specialists in other difficult groups will soon be added to this list. Nearly all of those named have promised articles on the collection and preservation of specimens.

Members who send specimens for identification are reminded that the specialists are very busy people and should not be asked to name specimens out of curiosity. If one has done his best to name his specimens, without success then he will find the specialist glad to aid him. And if he would help the specialist to correct identification. he should send the best specimens he can find with any note he may think serviceable. Above all he will not forget to fully prepay postage and to enclose stamped and self-addressed envelope for reply.

The club has already issued a folder explaining its aims, copies of which may be obtained from the secretary. The constitution and list of members will soon be published. Members are expected to report upon their studies to the president at least four times a year. These reports will subsequently be published in the AMERICAN BOTANIST. The dues are fifty cents a year and all persons interested in plants are cordially invited to join. Address the secretary for further information or in applying for membership.

NATIONAL FLOWERS.

By MRS. BERTHA TAYLOR.

The national flowers of other countries have most of them been chosen on account of some historical association. Scotland has chosen the thistle as her flower. The story is this: During a night attack which some Danes were making on a body of Scots, a bare-footed soldier trod on a thistle and in his agony, gave a cry which aroused and saved the sleeping men. Well may the motto of the order of the thistle be "Nemo me impune lacessit." No one wounds me with impunity or in Scots dialect, "Take tent how ye muddle with me."

St. Patrick, the patron saint of Ireland at one time traveled as missionary over Ireland. One day while preaching he was anxious to explain the doctrine of the Trinity. The people failed to understand and refused to believe that there could be three Gods and yet but one. The holy man seeing a shamrock peeping from the green turf on which he stood, gathered it and showing it to then exclaimed: "Doyou not all see in this simple littlewild flower how three leaves are united in one stalk, and will you not then believe that there are indeed three persons and yet one God?" His audience easily understood the simple illustration. From that period the shamrock became the national emblem of Ireland and dearly is it loved by all the warm hearted, affectionate people.

Clovis, founder of the French Monarchy, married Clotilda of Bergundy, who was a Christian. She was very anxious that her husband should embrace her religion. Her persuasions were of no avail, however, until there came trouble between the Germans and the French. During a severe battle the French were nearly beaten when Clovis exclaimed: "O God of Clotilda, if thou wilt grant me this victory I will henceforth worship no God but thee!" His prayer was heard and the Germans were routed with great slaughter.

Clovis remembering his vow was soon baptised, and an old legend tells us that immediately after the ceremony an angel appeared to him and presented to him a Fleur de lis, to testify the approbation of heaven and his right to the French crown. Since that time France has been called the "Empire of Lilies" and the Fleur-de-lis or the old fashioned flower of our garden the Flower de luce, the national flower of France.

The longest and most bloody war that ever desolated England was named after the lovliest flower of our garden. The rose was used as the badge of the two parties, the red by one side and white by the other. The cause of the war was a dispute as to the rightful heir to the throne. It was carried on for many years until at the marriage of Henry VII. with Elizabeth of York the two rival houses were united. The roses then blended together became the national flower of England and were emblazoned on her arms and on her coin.

RUDBECKIA HIRTA.

The cone flower, (*Rudbeckia hirta,*) is said to be an introduced plant in this part of the country, but it springs up so spontaneously in the meadows, fits in so naturally with its usual environments, and is so thoroughly at home wherever it obtains a foothold that it is hard to realize it was not always found here.

Though classed as a "pestiferous weed" in some parts of the West, from which it is said to have come to us, it has never become so plentiful here as to be troublesome. Growing usually in the meadows, which are occasionally plowed up, it is exterminated before there is any danger of its becoming too plentiful.

If we might ascribe to a plant the power of being able to select an environment best adapted to set it off, surely we would have to admit that the Rudbeckia displays rare talent in that way, for the green grass of the meadows forms the most beautiful setting possible for the gorgeous yellow blossoms. If the Rudbeckia was a shade-loving plant, ferns would make a pretty background, but it loves the sunshine and the swaying grasses are its fitting accompaniment.

The name Rudbeckia was given in honor of the Swedish botanists Rudbeck, father and son, and the specific name hirta aptly describes the plant, as the leaves bristle with stiff hairs on both upper and under sides, and the stem and calyx as well.

The common name cone flower is also apposite. When the blossoms first open, the receptacle on which the small, purplish-brown disk flowers appear is almost flat and button-like, but as the blossoms grow older this receptacle expands into a very prominent cone-like structure, which gives a unique personality to the large, showy blooms.

Black-eyed Susan is another common name, the origin of which it might be interesting, but probably impossible, to trace. It must have been given by one who admired the black eyes of some lively Susan of the past. Common names are so apt to be circumscribed to limited localities, the wonder is how this particular one could have become so generally adopted.

Yellow daisy is another quite common name, but the use of this should be discouraged for the simple reason that the *Rudbeck-*

ia is not a daisy. To those addicted to using this name, we suggest that they make a comparison of the blossoms. Though both belong to the Composite Family, and so are cousins, a very superficial examination of the blossoms will show at least one difference, which is, that the disk flowers of the daisy are not arranged in cone-like fashion, like those of the *Rudbeckia.* It is just as easy to remember the name cone flower as it is yellow daisy, and the former name is so descriptive and appropriate it is hoped the latter will fall into disuse.

The blossoms of the*Rudbeckia* are supposed to be only of a very vivid, golden yellow color, but in reality they vary considerably in depth of tone, some being a light, lemon yellow and others ranging through gradations to a deep orange tint. It has been observed that flowers of particular tints are found in the same localities year after year.

In the summer of 1891 the writer found in a field in the town of Gates, near Rochester, N. Y., a few blossoms of *Rudbeckia hirta* which differed from the normal type in having a band of dark color at the base of the rays. In 1892 the same field was again visited and blossoms showing similar variations were found. That season a number of flowers with different markings were gathered, and the specimens formed a well-marked series. In some there were only faint lines. like pencilings, at the base of the rays; in others the lines were heavier and darker, the center line sometimes extending from the base to the apex of the ray; the rays of some of the flowers were all more or less shaded with brown; some showed a band of orange distinctly darker than the rest of the ray; the series culminated in specimens in which the band at the base of the rays was as distinct and as dark in color as in *Calliopsis.* As the band grew more distinct, the flowers decreased in size, those showing the darkest coloring being not much larger than th blossoms of *Calliopsis.*

The*Rudbeckia* takes kindly to cultivation and is an attractive feature in the wild garden. From a root accidently transplanted into a city yard, each year an increasing number of plants have sprung from the dispersed seeds, until they have become a distinctive feature, much admired by the passers by and prized by the possessor. Both flowers and plant seem to improve by cultivation, and we commend the *Rudbeckia* as worthy of introduction to any garden, and particularly to one where a corner is reserved for our wild flowers. I have found it difficult to make transplanted roots live, but from seeds scattered I have a vigorous plant which bloomed freely late last summer, and is very flourishing at the present time.—*Florence Beckwith in Vick's Magazine.*

HABITS OF THE DANDELION.

Let us take the history of one very common flower, the common dandelion. When it is in bud, the flower-stalk is short and lies on the ground. When the flower is ready to open, the stalk rises itself perpendicularly. What we call a dandelion flower is really a bunch of flowers, some hundred florets ranged on a flat disc. The outer rows of florets open first, then the inner and inner ones ending with the center ones. This lasts some days, and every evening about sunset the flower head closes up so as to protect the delicate florets from night dews and probably from night insects. I found, however, that I could keep a dandelion awake all night by exposing it to the blaze of an Argand lamp, which prevented it going to sleep. When all the florets have opened, the yellow corollas shrivel up, the stalk lays itself down on the ground so as to be out of danger and the seeds gradually mature. When they are ripe, the flower-stalk by some mysterious instinct becomes aware of the fact, and raises itself so as to stand up boldly in the wind, which seizes the seeds by their beautiful parachutes and carries them off to fresh fields and pastures new, and thus enables the plant to sow itself in any recently turned ground or in any other suitable locality.—*Lord Avebury (Sir John Lubbock) in Natures Notes.*

A NEW FORM OF BRUNELLA.

Francis Canning in a paper recently read before the Pennsylvania Horticultural Society mentions a new form of *Brunella* as follows: "There is a wild plant which of late years has adopted unusual circumstances and is an instance of where the vegetative organs become the reproductive. This plant is *Brunella vulgaris*, or self-heal. Apart from its usual haunts, roadsides and fields, it has established itself in well-kept lawns, where even the action of the lawn mower has failed to eradicate it; in fact, it has so adapted itself to its new way of living as to succeed admirably. As it is unable to flower it reproduces itself by offshoots and roots from nearly every joint, and if left undisturbed will soon form undesirable looking patches. These new conditions have only occurred during late years, and its speedy eradication is advisable." The same form has been common for some years in the editor's lawn and two years ago specimens were sent to Prof. Peck the New York State Botanist. Since this form is best handled if given a name it is here proposed to call it *Brunella vulgaris* forma *nana*. It is a curious fact, not generally known that Linnaeus wrote the generic name *Prunella,* though all subsequent writers begin the word with a B.--*Willard N. Clute.*

EPIPHYTES.

The relation of these plants to their nutrient substratum is a very interesting question,because it enables us to see the particular way in which they obtain their food. Those that grow on the bark of trees—and they are numerous among Orchids—have a peculiar method of maintaining themselves. Their roots are adnate to the bark, exposed on one side to the air, and form projecting lines and ridges, ramifying in all directions, and often constituting a regular trellis-work cemented to the bark. These serve as instruments of attachment, but at the same time they also absorb nutriment from the substratum,the decaying bark upon which the plant is epiphytic. During periods of drought this absorption is suspended and the plant is practically dormant, but when the rainy season commences there is a long duration of wet weather, the water trickling over the surface from the collecting ground of leaves and twigs overhead, descending lower and lower, and bringing down not only tiny loosened particles of bark and decaying vegetation, but mineral and organic dust which has collected, dissolving all the soluble matter it finds on its way, and so reaches the roots and rhizoids in the form of mineral and organic compounds, chiefly the latter. In this way the requisite nourishment is conveyed to these curious epiphytes, whose period of active growth occurs during the rainy season.

The roots of epiphytal Orchids differ from those of terrestrial plants is being covered with a white papery substance, called the velamen, and the cells of the velamen serve the double purpose of condensing or absorbing aqueous vapour from the atmosphere, when any is present, and of protecting the underlying cells from excessive evaporation during periods of drought. In its absorptive character it is analagous with the outer cells of the bog-mosses (*sphagnum*) and *Leucobryum*, where the small chlorophyll-bearing cells are covered by large colourless cells, having very thin walls, which are variously perforated, and not only absorb water in liquid state, like a sponge, but also have the power of condensing it when in the form of vapour. A double function appertains to the roots of epiphytal Orchids, firstly to fix the plant to the bark and secondly to supply it with nutriment. When the tip of a root comes in contact with a solid body it adheres closely to it, flattens itself out more or less, develops papilliform or tubular cells, which grow into organic union with the substratum, and act as holdfasts. But if the root extends beyond the limit of the substratum it ceases to develop these clamp-cells, and hangs down in the form of a white filament. Many of these aerial roots do not become attached at all but hang freely in the air, often forming regular tassels.

The power of condensing aqueous vapour, and other gases as well, is of the greatest importance to these plants, for the bark to which some of them are attached is anything but a permanent source of moisture, and when this supply fails the only possible method of acquiring it is by condensing any that may be present in the atmosphere. When this supply fails the velamen dries up, and then acts as a medium of protection from excessive evaporation from the underlying tissue, and the plant then goes to rest. It must not be supposed that epiphytal Orchids grow in a perpetually moist atmosphere in the shady primeval forests. Many of them grow in only partially shaded spots, and in regions where periods of drought occur regularly every year, during which time there is a more or less complete cessation of vegetative activity, when the use of a protective covering for the roots is at once apparent. Most Orchids which are furnished with aerial roots perish if planted in soil in the ordinary way, but a few of them will occasionally bury their roots spontaneously in the earth, in which case they cease to develop the papery envelope, when they exercise the same functions as in the case of land plants.

Some other plants besides Orchids exhibit this papery covering on their aerial roots, but more frequently these roots are furnished with a dense fringe of so-called root hairs, arranged in a broad zone behind the growing point, which are packed so closely together as to have a velvety appearance. These aerial roots never reach the ground or adhere to any substratum, and their function is entirely to condense and absorb the aqueous vapour from the air in which they are freely suspended, as has been proved by direct experiment. Plants which have this kind of root grow in places where the air is very moist all the year round, and where the temperature does not fall below the freezing point. Where the air becomes periodically dry they cannot exist, because they have no means of preventing excessive dessication, a contingency we have just seen to be provided for in the papery covering of the roots of epiphytal Orchids.

In many parts of the tropics, although the rainfall is heavy, there is generally an intermission of several weeks, and it is obvious that the epiphytes would wither and die if some provision were not made against such a contingency. The Bromeliads have reduced the evaporation from their leaves to a minimum, and made them hard and tough. Epiphytal ferns store up moisture in thick, leathery, and scaly rhizomes. And among Orchids we find the modified stem known as the pseudobulb a unique contrivance for retaining leaves through the longest drought. In some cases when the leaves are thin, they fall away altogether, and the plant is reduced to a bundle of green pseudobulbs, attached to its support by a few almost dry aerial roots, and thus it remains dormant until the return of the rainy season. The deciduous *Dendrobiums* form very good examples of this type. Sometimes the pseudobulbs are large and very fleshy, and the leaves are not deciduous, as in the case of *Oncidiums, Odontoglossums,* etc., while some seem to rely almost entirely upon their thick leathery leaves as a means of storage, as in the case of *Oncidiums* of the *Lanceanum* and *Jonesianum* groups. Some there are which have both thickened pseudobulbs and thick leathery leaves, as certain *Cattleyas,* etc. Conversely we find others which have no pseudobulbs, though the leaves are more or less fleshy, as in *Masdevallia,* and others in which both features are practically absent, as in the *Pescatoreas, Bolleas,* and *Warscewiczellas,* a pretty sure indication that these plants have no long periods of drought to provide against. In short, they remain active almost throughout the year, and should be treated accordingly.

In a chapter entitled "Up in the Trees," Mr. Rodway has given a most graphic account of the epiphytes of Guiana. He states that the gloom of the forest is so great that very few plants exi on the ground, and in order to see the representatives of the pretty wood flora of temperate climes we must look overhead. In the recesses of the forest there is nought but bare trunks and leafless "bush-ropes." Even the epiphytes want light, and cannot exist without it, and where this precious influence is obtainable, they crowd every branch and twig, almost to the ground, and carry on the struggle for life right up to the tree tops. Monster arums twelve feet in diameter occupy the great forks, and throw down long cord-like aerial roots. Pushing those cords aside, the plants are barely discernible on account of the crowd of other epiphytes which surround them. Screens of creepers with festoons of handsome flowers, masses of *Rhipsalis,* pendulous branches of grass-like ferns, and thousand epiphytes on every branch obscure the view, and make it hard to say from whence a particular aerial root is derived. Some branches are occupied by dense rows of *Tillandsias,* which push everything else aside and take possession of the upper surface, where their vase-like circles of leaves form reservoirs of water against the time when little or no rain falls, which reservoirs are utilised by the beautiful *Utricularia Humboldtii.* Hardly a twig is free from epiphytes unless the gloom is too great, and these plants vary greatly in the amount of light they require. Some grow on the shady side of the trunks and never see the sun, others exist and thrive in places where we might expect them to be burnt up. Among the mosses and hepaticae grow tiny Orchids with almost microscopic flowers.

The study of epiphytes in their native surroundings is a fascinating subject, and the fact that they can exist in the way that many of them do shows a marvelous power of development in some past age. They are for the most part children of the moist forests, and their very existence indicates the victory they have won in their struggle for light. They have literally been forced up into the trees, and have attained their present development by seizing positions of vantage with very little expenditure of materials. Commencing as humble occupants of the shady soil in the forest, it has been remarked that they have, during the course of ages, literally clambered up into the trees, striving after the light, and ever struggling against the precarious and fluctuating supplies of moisture and humus, inventing new absorbing and fixing organs, and contriving fresh devices for resisting threatened death from thirst or starvation, until at length their perilous career was crowned with success, and they formed aerial meadows and shrubberies. Their evolution is still reflected in the forest, where the simplest still lurk low down in moist shaded crevices on the tree trunks, and the more specialized ones are ranged successively upwards, until even before the tree tops are reached perfection is practically attained. --*Indian Gardening*.

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

RELATION OF ELEVATION TO THE SHAPE OF SEEDS.--Winged seeds are only useful when they start from a certain height. They occur in many trees-- ash, lime, maple, sycamore, pine, fir, beech and hornbeam--but not on low plants. Hooked seeds, on the contrary, would be useless on high trees or even on shrubs above the height of a horse or cow. They occur on docks, burrs and many other herbs but are not found on a single tree or even on any shrub. Edible seeds especially characterize low trees and shrubs loved by birds--such as the cherry, holly, ivy, yew, etc., etc.--*Nature Notes.*

SLEEP OF THE DAISY.--It is freqently stated in regard to the common ox-eye daisy (*chrysanthemum leucanthemum*) that its ray flowers fold over the disk at night, and opening in the morning earn for it the name of daisy (day's eye.) As a matter of fact, the ray flowers do nothing of the kind--at least in New York state daisies. The habit of closing at night is reported of the English daisy which is quite a different plant from ours, and it is possible that the reputation given our plant has come by unconscious transference; though it would be interesting to know if the ox-eye daisy ever closes after the ray flowers are once spread.

THE STUDY OF PLANTS.--The unsolved problems of plant life are almost infinite. To make a collection, is no doubt interesting, but it is like making a library. What is the use of the books if you do not read them? What is the value of a collection if you do not use it? Aristotle said the greatest happiness of gods or man was to be found in the study of nature, and I think that one of the wisest of the many wise sayings which we owe to this distinguished man.--*Lord Avebury in Nature Notes.*

WHEN DO WINTERGREEN BERRIES RIPEN?--Most books that mention the subject say that the wintergreen (*Gaultheria procumbens*) does not ripen its berries in autumn, but that they ripen under the snow. Who can say whether this is correct or not? The same idea prevails with better reason regarding the partridge berry (*Mitchella repens*) though one author speaks of them as "lasting well into the winter." It is, however, no uncommon thing to find the vines at flowering time thickly covered with ripe berries, and it is a question how long one crop of fruit lasts; possibly for two years or more if the partridge does not claim its own in the meantime.

CATALPA LEAVES.--Britton and Brown's Flora describes the leaves of *Catalpa bignonioides* as strongly scented. This tree is quite abundant in the neighborhood of Philadelphia along water courses, but I have failed to notice any particular odor in the leaves. It would be interesting to know from the editor of THE AMERICAN BOTANIST or its readers what the experience of other observers has been.--*C. F. Saunders.* (The editor has carefully examined a large number of both *C. bignonioides* and *C. speciosa* and can find no marked odor in the leaves of either. Further observations are desirable, however. While examining the leaves another interesting fact developed in the way the trees bloom. The side toward the sun, so far as observed, invariably bursts into bloom first. No doubt this phenomenon is observable in most flowering trees, but is never so noticable as in the sun-loving catalpa.)

SEEDS OF PITCHER PLANT WANTED.--Any reader of THE AMERICAN BOTANIST who can collect a small packet of seeds of the pitcher-plant (*Sarracenia Purpurea*) and send them to my address during the summer would do me a great favor. None grow in the vicinity and I should like to raise them nearer home if possible. Will return postage and favor in any way I can.—*Asa A. Schaeffer, Kunkletown, Pa.*

USE OF THE COMMON WOOD FERN.—The dealers in bouquets do a lively business in New Orleans in winter, for flowers are cheap and easily grown. The greenery that is mixed with the flowers, however, is not so readily produced it would seem, for a northern fern, no other than our common wood fern (*Nephrodium spinulosum intermedium*), is the principal thing used. Since this fern is not konwn to grow south of Tennessee I had the curiosity to visit a florist and make inquiry regarding it and was informed that the fronds are all from the New England States, being sent down by the millions in Autumn and kept in cold storage until wanted. Thus does bleak New England contribute to the enjoyment of a Southern winter.--*Fern Bulletin.*

THE CHAYOTE.—Much has recently been written about a new vegetable, the chayote (*Sechium edule*), commonly grown in Porto Rico, and now recommended for cultivation in the warmer parts of the United States. It does not appear to be known that the chayote is not entirely new to the United States, though it has long been grown in Louisiana and is common in the markets of New Orleans. It is known among the French as "*mirleton,*" while the Italian marketmen call it "vegetable pear." In shape it is much like a cucumber, largest at the blossom end. The plant is of the melon family, but unlike other species the chayote has but a single large seed in each fruit. The plant is a cucumber like-vine that spreads rapidly and the root is perennial, but will not withstand frost. Hundreds of tons of the chayote are annually sent to the London and Paris markets from the warmer parts of the Old World.

EDITORIAL.

From many parts of the Northern and Eastern States, come reports of such frequent and copious rains that the cultivators of the soil despair of securing their usual crops. In the valley where the BOTANIST is published it has rained nearly every day for three months. Discouraging as such weather must be to the farmer, and the botanist, they may gain some small consolation from the reflection that this is a great year for nature's wild crops. Trees, shrubs and herbs are growing vigorously and getting a start that will not soon be lost. The autumn show of asters and goldenrods promises to be unrivalled and ferns are looking better than they have for years.

Those who intend to have a bed of wildflowers in their garden next spring may be advised that no time should be lost in looking up the plants in field and wood. All traces of such plants as the adders tongues, spring beauties and Dutchman's breeches, have probably disappeared, but the violets, trilliums, blood-root, Solomon's seal and others may still be found. Among wild plants that are best suited for shady gardens may be named the columbine, the wild lilies, the lungwort, mitrewort, coltsfoot, Jack-in-the- pulpit, hepatica and the anemones.

It was found impossible to get the illustrations for the proposed key to the wildflowers ready for this issue and as the key, when ready, will run through several numbers, it is thought best to postpone its publication for a few issues until all the matter is ready.

It is interesting to observe the different ways in which our two societies for the protection of plants go about the business in hand. The original "Society for the Protection of Native Plants," has already issued six leaflets calling attention to the plants that need protection and suggesting means of protecting them. The latest publication is a poster which is sent free to anyone who will place it in a conspicuous place. Membership in this society costs nothing and the leaflets are sent to all who enroll as members. The secretary is Miss Maria E. Carter, Boston Society of Natural History, Boston, Mass. The imitator of this society, the "Wildflower Preservation Society of America," is approaching the subject by means of illustrated lectures held mostly in our larger cities. Membership in this society costs a dollar a year. The secretary is Charles L. Pollard, National Museum, Washington, D. C. Those who are actively interested in protecting the wildflowers will probably find one or the other of these societies to meet their requirements.

"It seems to us that the director of the Bronx Zoological Park is unnecessarily agitated over the threatened extinction of wild flowers within his domain," saye *Leslie's Weekly.* "He writes a long letter to the *Herald* complaining that in spite of all 'printed warning and appeals in three languages,' and the efforts of a corps of detailed watchers, the children will persist in picking the wild violets, the arbutus, the columbines, and other wild flowers growing in the park, and, in consequence, all these natural attractions are soon likely to disappear entirely. We fail to be moved by the director's pathetic plea for the wild flowers, our sympathies being rather with the children who are described as rushing to them with 'cries of joy,' and picking them 'as fast as their fingers can fly.' We doubt very much whether these 'raids' can be stopped, even if the police, the park employes, and the parents combine in the effort, and, what is more, we would not stop them if we could. Daisies, dandelions and violets will doubtless continue to grow in the vast spaces of Bronx Park for years to come, despite all the depredations of 'little hands,' and if they are finally exterminated in this way, as the director fears, why, let them go. What does it matter? Far better so than to institute a government of terrorism in the park for the repression or punishment of the little people who are charged with rushing with 'cries of joy' among the flowers."

Leslie's Weekly is quite right in this matter. There is some reason in preventing the public from mutilating the dogwood and other trees for their blossoms or uprooting choice wildings, but with other plants the case is different. Every year the Bronx meadows are fairly blue with violets and yet not one of these showy flowers ever sets seed. The seeds are produced late in the year by inconspicuous flowers, and the early blue blossoms seem to be designed by nature solely for the children. Picking these flowers will not injure the plant in any way. It would seem far better to establish certain permits for picking the flowers, and detail some of the numerous park employes to superintend the picking, than to protect these useless flowers as is now done. The fact that certain flowers could be gathered by permission would certainly teach children that the others were not to be touched.

An applicant to whom we recently mailed a sample copy of THE AMERICAN BOTANIST sent back an order for the back volumes and a year's subscription with the remark: "I like this sample copy very much, it is so comprehensible to the amateur botanist" and another adds in renewing her subscription, "I find the magazine useful and interesting." These two letters have struck the key-note of our policy with regard to this publication. To make a useful and interesting magazine that is comprehensible to the beginner in botany as well as to the advanced student is our sole aim. To accomplish this we need an abundance of original notes and we hope our readers will have the BOTANIST in mind when preparing articles for publications.

The *Journal of Mycology* has again made its appearance. It was begun in 1885 by Prof. W. A. Kellerman and continued four years, then the U. S. Department of Agriculture issued three volumes after which it was discontinued. The new series is in charge of Prof. Kellerman and the initial number which contains 48 pages makes a very encouraging beginning. A portrait of Prof. C. H. Peck is given and there is a very complete and extensive index to North American Mycology. The journal will be issued quarterly.

THE AMERICAN BOTANIST

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CONSPICUOUS AUTUMN FLOWERS.

BY PROF. W. W. BAILEY.

The last weeks of September are particularly rich in flowers. Nature appears to make one supreme effort and now "gathers up her robes of glory" as she prepares for the bleak and inhospitable winter. We do not find these showy flowers in the woods so much as upon their borders and in swamps. While the prevailing colors are blue and gold, the asters and goldenrods being largely displayed, we are by no means confined to these tints. The scarlet cardinal flower can still be found by water-courses, the most intense, if not the grandest of our wildflowers. A *Lobelia,* is the type of a very handsome family, known to every one in cultivation through the pretty blue trailing vine, *Lobelia erinus,* of hanging baskets. In the Middle States there is a large wild blue *Lobelia*--as handsome nearly, as the red one. Both are susceptible of cultivation and improvement.

In quite similar places one often finds the monkey flower or *Mimulus ringens,* tall and handsome with blue flowers. It belongs to the Figworts. Besides the goldenrod and asters, the Compositae present us various wild lettuces of the genus *Prenanthes,* recognized by their persistent cream-colored heads. But most brilliant of this family are the bur marigolds in swamps, the yellow and rosy coreopses and certain sunflowers. The latter grow in copses or along waysides. The bogs are made very gay with the splendid disks of these star flowers; indeed every Composte is regal--even though it be a weed.

And what, by the way is a weed? The question may be variously answered. Some define it as a plant which grows where it is not wanted, while Lowell tells us "it is a flower in disguise." Under either definition the same plant may be a weed or a prized acquisition according to circumstances. Some things that were originally introduced into this country as ornaments have so increased and spread as to become nuisances; then they are weeds. On the other hand, some weeds of ours, transplanted to a region where it is rare, may become precious. We might multiply examples.

As everyone knows, our two species of gentian, the fringed and the box or closed, are characteristic autumn plants. So is the grass-of-Parnassus. This plant is found in wet or boggy places--with a large white flower suggesting an anemone, but prettily streaked with green. Curiously enough, it belongs in the Saxifrange family. This leads me to say an explanatory word concerning this matter of relationship. The non-botanist is often annoyed or confused by it, but after all it has a philosophical basis. The ancients resorted to the most obvious classifications--usually founded upon salient peculiarities. But even they recognized the fact that certain plants bore a close relation to one another. It is on this fact of relationship or blood affiliation, so to speak, that modern systems have grown up. Originally tentive, they yearly became more scientific and accurate. The anatomical structure, the morphology, the life-history enters more and more into consideration in determining a plant's position. Generally speaking, the more highly developed it is, the more widely differentiated or specialized, the higher it is regarded in the scale.

Providence, R. I.

SOME SURPRISES FOR COLLECTORS IN PORTORICO

By O. W. Barrett.

The first surprise that awaits the Porto Rican plant hunter is the almost entire absence of a primitive or strictly virgin flora; for in only two or three limited areas of the Island will he find the surface clothed as it was in the time of the Arawaks. Over ninety per cent of the Island has been modified by the hands of man, as regards flora and probably three-fourths of the Island may be called domesticated. He would naturally expect to find palms and orchids in great abundance, but he will be negatively surprised. The palm flora is small, but according to Prof. O. F.

Cook, it is almost unique. And the orchids of Porto Rico are conspicuous by their absence.

He will meet many species of plants which occur in the Southern States and this may or may not surprise him, according to his experience. Accustomed to see *Diffenbachia seguine* as a green house pet, he will be surprised to see it flaunting its splendid dark green leaves at him, from the midst of some damp thicket. The leaves frequently have one or more small white spots on their upper surface, and it is these snowflake-like spots in the wild plant which have been bred up into the conspicuous blotches and streakes of the conservatory specimen.

If he looks carefully in swampy ground he will perhaps find a most peculiar plant of the *Amorphophallus* type. This plant which, by the way, has just been sent to the New York Botanical Gardens, and which may prove to be a new species, possesses one of the most interesting forms of leaves I have ever seen; the blade is neither compound nor palmate, but a peculiar crazy mixture of both, and in addition the intravenal tissue is thrown up into ridges and filled with holes of various sizes. The petiole is a study in itself; its surface seems to shine with an iridescent lustre derived from metallic-looking cells just beneath the epidermis; the surface is blotched and marked with light and dark grays and browns, like the skin of an adder; and apparently not content with this scary-display, the plant feebly defends itself with irregularly placed and almost harmless conical spines. Sacrilege though it may be, the large flat corm of this wonderful plant is dug and eaten by the half-starved half-breeds of the interior. Its flower seems to be unknown, even to the natives, but we hope a little cossetting and the judicious use of phosphoric acid will enable us to see a great treat in the flower line within a few months.

Pancratium caribaeum grows wild along the sea-beach and even in sandy fields back from the coast. Its flowers are four to six inches across and exceedingly fragrant. Florists list it at about ten cents per bulb. *Hippeastrum equestre,* the Barbadoes lily, is one of our commonest weeds. A field of these flowers in bloom in the early spring is surely a magnificent surprise. For all around, rough-and-tumble, catch-as-catch-can vitality, I believe this bulb cannot be beaten. Plow them up, mangle them with the harrow, and let them bake on top of the soil throughout the dry season, and yet when it comes time for them to display their red flags they will do so just as if nothing had happened.

Tree ferns at sea level are another surprise; and of three species at that. *Tabernaemontanea coronaria* has escaped from cultivation. The Amazon lily is also escaping. And I have seen *Crinum amabile,* a three-dollar bulb from Sumatra growing luxuriantly in a road side thicket. Our sister Island, Jamaica, abounds with ferns of all families; but I doubt if the collector could find one-half of her five hundred or more species on this Island.

Porto Rico.

THE FRUIT OF THE MAY APPLE.

The May Apple (*Podophyllum peltatum*) seems to have been so named because it ripens in July instead of in May. In many a youngster's mind the season for May Apples and Sunday school picnics are inseparably associated for no wide-awake boy ever spent a whole day in the woods without investigating every likely object in the vicinity which of course includes this fruit. On the subject of its edibleness Mr. C. F. Saunders writes entertainingly in the Philadelphia *Record* as follows:

"But the great mid-summer crop of the woods is the May apple yield. Everybody knows this common plant in the spring, when the appearance of the umbrella-like leaves is the delight of the children. As summer advances the foliage turns yellow and becomes bedraggled, and the pear-shaped fruit, about the size of a butternut in the hull, grows to be the prominent feature. This is now ripe.

Though possessing a rank, disagreeable odor when green, this fruit at the time of maturity is delightfully fragrant, with a perfume hard to define, but combining the characteristic smells of cantaloupes, summer apples and fox grapes. Two or three brought in and laid on the mantel will perfume the whole room.

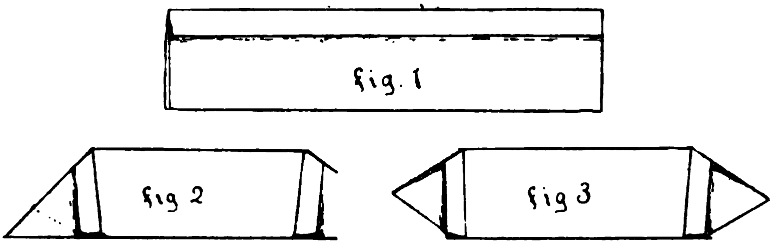
As to the edibleness of the fruit, that is a matter of taste; some people loathe it, while others are very fond of it. It ought not to be condemned, however, on the evidence of unripe specimens.

but should be accorded the advantages of a judgment based on mature fruit. When ripe the little apples are yellowish in color and drop into the hand when touched. The outer rind is rejected by connoisseurs, the portion eaten being the translucent, jelly-like mass that encloses the seeds. On a hot day this is found to be a refreshing acidulous morsel by many a thirsty rambler. New England housewives sometimes pickle the green fruit."

In the Tropics there is a highly prized fruit known as the Guava (*Psidium*) which although not closely related to the May apple, is in size, shape, color, structure and taste a very good likeness of it. Guava "dulce" is a famous product of this fruit. Possibly we may yet have May apple dulce.

A HANDY SEED PACKET.

Whether one happens to be far afield or only in his own dooryard the necessity for a packet that will hold seeds is often felt. An old envelope will do in a pinch, provided one happens to have it at hand, but a much better article can be quickly made by one who knows how, without the use of scissors, paste, pins or twine, that will securely hold the very smallest seeds.



A HANDY SEED PACKET.

Fig. 1, preliminary folds; fig. 2, corners folded back; fig. 3, completed packet.

This is how it is done. Take a sheet of paper about six by eight inches in size and fold in the middle, so that the two eight-inch edges are parallel. Next fold these edges over twice, making about a quarter inch fold each time, (fig. 1.) Then make a diagonal fold across each end by bending the upper folded corners backward as in figure 2, after which make a third fold at right angles to the second (on the dotted lines in figure 2) push the free end under the first fold (fig. 3) and the packet is complete.

This packet has the merit of being instantly made, when desired, wherever a piece of paper can be procured and if properly constructed will hold without spilling flour, dust or the finest seeds. It is worth the while of anyone who does not know how, to get a sheet of paper and learn to make this packet. There are hundreds of occasions when the knowledge will be useful—W. N. C.

ORIGIN OF SPECIES BY MUTATION.

Three kinds of evening primroses occur in Holland, all three introduced from America about a century ago, but since escaped from cultivation. The youngest of the three or rather the one most recently introduced, and at the same time the most rare, is the large-flowered evening primrose, described at the beginning ot the nineteenth century by Lamarck, and named after him *Oenothera Lamarckiana*. It is a beautiful, freely branching plant, often attaining a height of five feet or more. The branches are placed at a sharp angle with the erect stem and in their turn bear numerous side branches. Nearly all branches and side branches are crowned with flowers, which, because of their size and bright yellow color, attract immediate attention, even from a distance. The flowers, as the name indicates, open towards evening, shortly before sunset, and this so suddenly that it seems as if a magic wand had touched the land and covered it with a golden sheet. Bumble bees and moths, especially those of *Plusia gamma* and of *Agrotis segetum*, are the principal visitors. During the hot weather the flowering period is limited to the evening hours. In daytime often nothing is to be seen but faded and half-faded flowers and closed buds. Each flower bears a long style with four or more stigmas, which protrude at some distance above the eight anthers, and would therefore, as a rule, not be fertilized without the help of insects. When the flowers, including their apparent stem, the calyx tube, drop off, there remains behind a perigynous ovary, which finally becomes a capsule. At first green, it becomes brown on ripening and finally opens with four valves, setting free the seeds. A stem with ten to twenty, or even thirty or forty, capsules is not rare, nor consequently a plant with a hundred or more fruits. And since each fruit contains more than a hundred seeds it would be quite possible for a plant of this species to reproduce itself several thousandfold, provided all seeds could germinate and grow.

It is this plant, *Oenothera Lamarckiana,* which exhibits the long-sought peculiarity of producing each year a number of new species, and this not only in my experimental garden, but also when growing wild. But in the latter case the new species have as a rule but a very short lease of life; they are too weak and too few in number to survive in the struggle for existence with the hundreds and thousands of their fellows. In the experimental garden, however, they can be recognized at an early stage, and with especial care may be isolated and cultivated. It is thus that in the experimental garden we are readily able to see that which, among wild-growing plants, is lost to observation.

The new species vary but little from the old. An inexperienced eye detects no difference. Only a careful comparison shows that here we have to deal with a new type. There are some, for instance a dwarf species, and species with a peculiar close crown (*O. nanella* and *O. lata*), which at once attract our attention, because they are short of stature. Again, some are more slender and delicate, others low and unbranched, or robust and tall. A difference may be detected in the shape of the leaves, their color and their surface. The fruits vary in the same manner; sometimes they are long, sometimes short, sometimes slender, sometimes stout. The more one observes these plants, the more differences one sees. Gradually it becomes apparent that here we have to deal, not with a chaos of new forms, but rather with a series of sharply defined types. Each of these types originated from a seed produced by the parent species, growing wild and fertilized in the usual manner, or growing in the experimental garden and fertilized artificially with its own pollen.

Here then we have our first result. The new species originates suddenly, without preparation or intermediate forms. But they do not differ from the old species like an apple from a pear, a pine from a spruce, or a horse from a donkey. The deviations are far smaller. But every one knows how difficult it is to distinguish the common oak from *Quercus sessilifora,* or the lime tree from *Tilia grandifolia.* Yet these are forms which by the disciples of Linnaeus are recognized as true species. And what botanist has not been entangled in the species of *Hieracium,* or who is able to recognize at first sight the closely related forms of *Cochleria?*

Because of the dying out of intermediate forms, more ancient species may be widely separated. On the other hand, more recent species, whose ancestors are still alive, may form narrow groups because of and with these surviving ancestors. Good illustrations of the latter are yielded by roses, willows and brambles as shown by the facility with which the closely related forms can be cross-fertilized, as well as by the great trouble the numerous bastards cause in determination. Such genera are found everywhere in the plant kingdom; the gentians of the Alps, for instance, or the *Helianthemums,* which with us seem to be composed of fairly distinct types. Everything indicates that in these cases the species are of more recent date, and that only through the dying out of intermediate forms the differences between the remaining ones have attained that degree of distinctness which so greatly facilitates the separation of the other groups.

In this regard the *Oenotheras* agree exactly with what may be observed in nature. Recent forms group themselves around the mother form with minute, hardly perceptible gradations.

Once formed, the new species are as a rule at once constant. No series of generations, no selection, no struggle for existence are needed. Each time a new form has made its appearance in my garden, I have fertilized the flowers with their own pollen and have collected and sown the seed separately. The dwarf forms produce nothing but dwarfs (*O. nanella*), the white ones nothing but white ones (*O. albida*), the *O. gigas* nothing but *O. gigas,* the red-nerved ones nothing but corresponding specimens. But a single form made an exception. This was the small *O. scintillans,* the seeds of which produced but a percentage of *scintillans* plants, but here this inconstancy is and was as much the rule as the constancy of the other species.

As an example I may cite *O. gigas* The plant is as tall as

O. Lamarckiana but has a more robust stem, denser foliage, a broader crown of large, widely opening flowers and stouter flowering-buds. The fruits attain but one-half the length of those of plants of the mother species,and consequently contain fewerseeds. But the individual seeds on the other hand, are rounder fuller and heavier. This type originated in my cultures of 1895 as a solitary specimen, which at first was overlooked. At that time I desired to hibernate some plants, and in the latter part of the autumn chose for that purpose twelve of the strongest and best developed. It was only in the following summer, when the plants began to flower, that I noticed that one plant showed differences, the importance of which I did not fully realize until the fruits, on ripening, became much shorter and stouter than ordinarily was the case. It was only then that I placed the raceme in a bag so as to prevent fertilization with other pollen. Afterwards this seed was collected separately and in the spring of 1897 sown in a flower bed between other beds sown with seeds of the normal *Oenothera Lamarckiana.* Immediately subsequent to germination no difference was apparent, but when the third and fourth leaves unfolded it suddenly became evident that a new species had originated. All plants differed from their neighbors, were more robust and bore broader, darker leaves. Though two to three hundred in number, all evidently belonged to one distinct type. Not having at the time, paid special attention to the mother plant, I was unfortunately unable to compare the latter with the type at this age. But when, during the summer, first the stems and afterwards the flowers and the fruits, made their appearance, the agreement became perfect. All specimens closely resembled the mother, and together they formed the new species, *Oenothera gigas.* This species therefore was at once constant, even though it found its origin in but a single specimen. Evolved with a sudden leap from the mother species, differing from it in general appearance as well as in the character of its various organs, it remained unchanged. It was no rough cast which selection had to correct and polish before it could represent a distinct form; the new type was at once perfect and needed no smoothing, no correction.

My other species originated in the same manner, suddenly and without transitions. We may therefore assume that species, when growing wild, do not appear gradually, slowly adapting themselves to existing conditions, but suddenly, entirely independent of their surroundings. Species are not arbitrary groups, as Bailey, and with him many others, believed should be deduced from the theory of descent, but sharply defined types, unmistakable, for one who has once seen them.

Each species is an individual, says Gillot, having a birth, a lease of life, and an inevitable death. From the moment of birth until the time of death, it remains the same. Only when taking this point of view can we reconcile our daily experience of the constancy of species with the theory of descent. This is fully confirmed by the results of my experiments.

If species originated gradually, in the course of centuries, their birth could never be observed. Were it so, this most interesting phenomenon would forever remain hidden from us. Happily it is not so. Each species as soon as born takes its place as peer in the ranks of the older species. This birth may be directly observed. One can even collect the seeds in which the new types are hidden, and one can observe the first steps in the development of these types. Literally the new species originates at the time of the formation of the seed, but it is born only at the time of germination. But at this period it is not recognizable as such; this only becomes possible after the first leaves have unfolded. The plant can then be photographed, and in this manner we may preserve the type as soon as it becomes discernible and recognizable. In fact, one can study the birth of a species as readily as that of any individual, be it plant or animal.

Any advance in our knowledge depends on the possibility of seeing species originate. Of course this does not refer to present species. Such a thing would be as impossible, as absurd, as expecting to witness the birth of an individual already inhabiting the earth. The species living at present are too old. But they may give rise to new ones. There seems to be sufficient reason for suspecting that this is happening at this very moment, and in our immediate surroundings, only we are not aware of it. Such cases must therefore be searched for with great care and patience.

Once found, they must be carefully and extensively studied. The one case which I have mentioned here shows sufficiently the great treasure of new facts which lies within our reach. All that is necessary is to overcome the first difficulties.—*From an article by Prof. Hugo de Vries in Science.*

THE AMERICAN BOTANICAL CLUB.

When the charter of the American Botanical Club closed, on the 16th of August, there were more than half a hundred members on its list. Around this nucleus there is certain to be formed a strong society that will prove its right to exist by many contributions to our knowledge of the plants.

A friend of the club has offered two prizes to be awarded in June, 1903, for the best report submitted by a member. To this the publishers of the AMERICAN BOTANIST add three more making a total of five. The first prize will consist of a copy of either Gray's, Wood's or Britton's Manual as the winner may select. The second prize is a copy of "Botanizing" by Prof. W. W. Bailey. The other prizes are three yearly subscriptions to this journal to be awarded to the three next best reports. All reports received up to June 15, 1903, will be included in the contest. The committee of award will consist of the president of the club and two other botanists to be selected later. Reports will be judged according to the following value: Originality of subjects 15, method of treatment 10, literary style 12, neatness of report 3. The reports may deal with any subject in botany that has interested the writer and each member may submit as many different reports on different subjects as he likes; all will be entered in the competition. It is probable that a report detailing the study of a single species will be most likely to be a prize winner, because this phase offers the most opportunities for original investigation, but it is possible that a study of some point in ecology, in the distribution of plants, or in the structure of plants will carry off the palm. Reports are to be submitted to the president in the usual way and are to become the property of the club.

An article of the constitution provides that when there are at least five members of the club in one locality they may form a local branch. These branches are to be self-governing. Each will be named for a flower or some noted botanist to be selected by the members of the branch. Since there are several cities in which we have more than five members, it is expected that we will soon have several branches of the club. The club now has a membership in fifteen states.

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

WINTERGREEN BERRIES.--In the neighborhood of Philadelphia these little berries (*Gaultheria procumbens*) ripen in September and October, and they are sold on the street fruit dealers' stalls at the same time with chestnuts. I gathered a couple today (September 7) evidently of the new crop, about three quarters red and one-quarter white.—*C. F. Saunders*

TUBER BEARING LABIATES--Referring to your note on this subject in the May issue of THE AMERICAN BOTANIST, I would mention *Scutellaria parvula* as an American tuber bearer in the mint family. It is a small plant, 4 or 5 inches high. At the one station where I have gathered it near Philadelphia, the root stock is sometimes beaded with a succession of the small tubers, reminding one of a section of a rude necklace.--*C. F. Saunders.*

REDUCTION OF SPECIES IN ANTENNARIA.--The lines separating the species in certain genera have been drawn so taut in recent years that they have reached the point of rupture. It has often been prophesied that many of the "new species" would turn out to be founded upon insufficient characters and this now seems coming true. Mr. Elias Nelson in the *Botanical Gazette* for August asserts that a large number of what have been described as distinct species of *Antennaria* are not even worthy of sub-specific rank. Mr. Nelson's observations have been carefully made and his conclusions will strike the majority of botanists as very sensible.

UNUSUAL PLANT NAMES.--A glance through any extensive list of plant names will disclose many names that apparently bear no relationship to the plants that bear them. A further study, however, often brings out some obscure connection between them. One of the most prolific sources of astonishing common names is found in the attempt of the public to anglicize the scientific terms. To this is probably due the name coptide applied to the gold thread (*Coptis trifolia*) but how the trilliums become known as Benjamins or the round leaved wintergreen (*Pyrola rotundifolia*) acquired the name of copalm is not so clear. In C. H. Dodge's "Flora of St. Clair Co., Mich.," a large number of these curious names appear.

The New Jersey tea (*Ceanothus Americanus*) is also called sprangles; the leatherwood (*Dirca palustris*) is known as wicopy, and the chicory (*Cichorium intybus*) as bunk. Universe-vine is a new one for the bear-berry (*Arctostaphyllos uva-ursa*) and crackers for the huckleberry (*Gaylussacia resinosa*). The wintergreen (*Gaultheria procumbens*), which has its full share of intelligible names, has also to its credit jinks, drunkards, pippins and red pollom. More light upon the origin of these names is greatly desired. Can any of our readers help us?

PROMOTING THE USEFULNESS OF PARKS.–The enjoyment of the populace in large country parks and forests, can be greatly promoted by allowing the picking of flowers and berries; and this permission may be safely given, provided the plants are not dug up by the roots, either by design or through carelessness. So valuable is this privilege, that it is better to run some risk of the extermination of desirable growths, than to prohibit picking. It is of course possible to keep sowing the plants which are most apt to be picked, like the columbine, wild geranium, anemone and blue violet. Some fragrant things ought to be carefully raised in the parks expressly for the enjoyment of the people who discover them appearing in the season.--*President Eliot of Harvard in Park and Cemetery.*

BIRDS AND BERRIES.—Apropos of Almon N. Rood's query in the April number of this journal as to what birds eat the berries of the winter-berry (*Ilex verticillata*) the following upon British birds and berries from *Nature Notes* will be be of interest. "From personal observation I have found that song thrushes and the rarer missel thrushes eat freely holly berries, a small tree in our garden being stripped of its fruit in the mild open weather of late autumn. The missel thrush also likes yew and rowan (mountain ash) berries. Black birds sink with outstretched wings upon bushes too slender for comfortable perching and devour the black berries of the bay and hard unfleshy laurustinus berries. The rose hips as soon as soft, hang sucked flat by the birds. In autumn too, I was surprised to see a robin eating myrtle berries." Another correspondent mentions wood pigeons eating the berries of the ivy.

WHAT IS THE JACKSON VINE?--In the Southern United States the make up of the Christmas decorations differs in several particulars from those farther North. The holly takes the place of spruce and pine, and the club-mosses or running pines (*Lycopodium*) are seldom seen. For festoons, a vine called Jackson vine is used. It has lanceolate, evergreen leaves and seems a very good substitute for the running pine. The botanical name for the vine is apparently not very well known. In appearance the plant is much like a *Smilax*. Britton and Brown credit the matrimony vine (*Lycium vulgare*) with the name of Jackson vine, but this is not the Southern plant of that name. Can some of our readers throw more light on the subject?

ROSETTE PLANTS AND PROTECTION FROM COLD.—Rosette plants exhibit some interesting adaptations for protection from cold, such as the geotropic curvature of the leaves and the development of red color. If a leaf of a rosette of smooth mullein (*Verbascum blatteria*) or of the common teasel (*Dipsacus sylvestris*) be examined late in October, it will be seen that it is pressed tightly against the surface of the ground and if the entire plant is dug up and placed in a collecting case for a few hours the leaves will be found turned downward so far that they are parallel with the tap root and form a cup around it. During the same season of the year the leaves of many rosette plants are quite red or purple. This is due to a substance known as anthocyan. It is the same red coloring matter that is present in the unfolding leaves and twigs of red maple (*Acer rubrum*) and soft maple (*Acer saccharinum*). Anthocyan changes some of the rays of light, which pass through it into heat, and of much importance in the economy of the plant during the cold days of autumn and spring.—*Ohio Naturalist.*

THE FLOWERS OF CRYPTOGAMS.—One of the popular distinctions between the flowering plants and the higher crytogams, is that the latter have no flowers. In the recently issued "Organography," however, Goebel extends the term flower to cover tuch structures as the fruiting spikes of *Equisitum, Lycopodium, Selaginella* and others, a flower being defined as "a shoot beset with sporophylls."

COLOR NOT ALWAYS OF USE.—It is generally conceded that the colors of flowers have been developed as an aid to cross-pollenation, being so many advertisements for the bee—and in like manner the colors and juicy pulp of berries have been construed as aids to the dispersal of the seeds, by being attractive to birds and mammals, there are, however, numerous berries, both juicy and of brilliant color, that seem never to appeal to the folk in fur or feather. Such are the berries of twisted stalk (*Streptopus roseas*), *Clintonia* and many others belonging tothe lily family. These hangs on their stems ungathered until wind and weather sow them in the surrounding soil.

FORMATION OF LEAVES IN WATER—Many water plants bear two sorts of leaves, those under water being usually thinner and much more divided than those produced in air. No doubt many have wondered as to the cause of this, for it will not do to say simply that the one sort differs from the other because produced under water. We must know the reason why. It has been frequently suggested that the shape of the sub-aqueous leaves is due to a lack of light, but according to the *Botanical Gazette* an elaborate series of experiments made by W. B. McCallum upon the mermaid weed (*Proserpinacea palustris*), has shown that aside from retarding the growth of all parts of the plant, a lack of light has no effect. No matter under what conditions grown the aerial leaves were broad and nearly entire, while those under water were always of the well-known dissected form. It was found possible to change the leaves from one form to the other in four internodes of growth, and to produce stems with several zones of each form alternating. Further experiments proved that the change in form is not due to nutrition, temperature or salts and there is still some doubt as to the real cause of the changes, but it now seems settled that it is not due to lack of light.

NEW USE OF WHITE-WOOD.--According to the *Medical Record,* the white-wood (*Liriodendron tulipifera*) is an efficient cure for the tobacco habit. The part used is the inner bark which may be chewed fresh, or powdered and mixed with liquorice and sugar and formed into tablets to be taken whenever a craving for tobacco is experienced.

THE NUMBER OF CACTUS SPECIES.--Many people who have been acquainted only with the prickly pear and the cholla cactus of the plains, perhaps to the detriment of their epidermis, will be surprised to learn that over one thousand valid species exist, to which more than three thousand names have been applied by botanists and horticulturists.—*West American Scientist.*

USE OF MOSSES IN MILLINERY.--Cora H. Clarke notes in the September *Bryologist* that two species of moss have been found in use in Boston by milliners. One species, conjectured to be *Hypumn purum* of Europe, is made into a sort of flat braid three inches wide and sells for twenty-five cents a yard; the other is formed into a sort of cord half an inch in diameter which looks like green chenille. This sells for ten cents a yard. The species used seems to be another foreigner, *Neckera crispa.*

THE CALIFORNIA POPPY.--More than one student has wondered at the unpronounceable botanical name of the California poppy *Eschscholtzia,* so guiltless of any relationship with the Latin from which most botanical names spring full-fledged. It appears that we owe it to the name of the first botanist who classified it, one Eschscholtz. Yet he was not the first discoverer, for centuries before, the Spanish mariners, even while far out at sea, had their attention arrested by what appeared to be sheets of golden flame spread over this unknown land towards which they were sailing. And when they came nearer they saw that this strange phenomenon was caused by millions upon millions of these golden flowers, "blazing along the Pacific coast, embroidering the green foot-hills of the snow-capped Sierra Madres, transforming acres and acres of treeless plains into royal cloth of gold."--*New Century*

STERILITY OF HYBRIDS.—Scientific men are fond of throwing it up to practical people that they are behind the times; but devotees of science are often among the crowd that live in glass houses and yet throw stones. Horticulturists have long ago learned that hybrids are as fertile as their parents; and orchids, gesneriaceous plants, and many other classes furnish abundant evidence. But that hybrids are sterile, or generally sterile, is still a doctrine on which many pretty "theories" are founded by leaders in science.—*Meehans' Monthly.*

THE TWO FORMS OF VIRGINIA CREEPER.--The typical Virginia creeper (*Ampelopsis quinquefolia*) has its tendrils tipped with sucker-like discs, by which the vine is anchored firmly to its support. This form is supposed to be the common one in Eastern America. Further west there is a form without discs which by some is considered a distinct species and by others only a variety of the first. This form is called variously *Engelmanni, laciniata, hirsuta* and *vitacea.* Additional observations are necessary to define the exact ranges of each form.

ERRONEOUS IDEAS OF BOTANY.--I will tell you where, in my opinion, a mistake is made now-a-days. Children in schools are led to think that they have mastered botany when they have gone through "Botany in Fourteen Weeks." After the majority leave school, not proceeding to higher schools, they think no more of the study but relegate it to the limbo in which rest the multiplication table and common fractions. A single flower or two, well taught in regard to every organ and adaptation to its circumstances, would be worth the whole of the text books. I often come across young people, in my rambles for flowers and rarely miss a chance of having a talk with them. Too frequently I hear with an inward groan the remark: "Oh! I studied botany when I was at school." That settles the matter and they look with pitying eye on me when I say that I am studying botany now and hope to know something about it some day. One graceless young "future president" had the sympathy to remark: "I suppose they did not teach botany in your school·--*Robert Blight, Norristown, Pa.*

EDITORIAL.

At first thought, it seems preposterous to assert that a single seed has within it the possibilities for a whole summer of original investigation; but the longer one considers the matter, the more certain it becomes that this is so. As soon as the cotyledons have shaken off the seed-coats the mysteries begin. The garden lettuce is ordinarily an unattractive plant that seems to grow only to be eaten, but when one has seen a bed of lettuce seedlings asleep with every pair of seed leaves folded together, the plant has a new charm for him that does not come by way of the table. The thought that Tennyson addressed to the "Plant in the crannied wall" must ever recur to the speculative botanist and spur him on to new endeavors. We do not care so much why or how a plant got its name; our queries are, how did it come to be; why is it as it is; and to what purpose are these various modifications of stem and leaf and flower and seed vessel. No one can find this out about a single plant in any one summer, nor yet many summers; but he can come nearer to the truth than he is at present. It is not necessary to go to distant lands for such study--the lawn, the garden, the weedy roadside furnish material in plenty--but just as a strange plant in the midst of familiar ones attracts the most attention, a new plant is most likely to prove best for study. At this season when every field and thicket is full of seedpods, our readers should not forget to gather seeds of the more attractive flowers for exchange with distant botanists. Few phases of botany give more pleasure than the rearing of a strange plant from a seedling to maturity.

The article upon the origin of species by mutation reprinted in this number is of value in confirming a theory previously held by many botanists, among whom the late Thomas Meehan was one of the foremost. The deeper we go into the subject, the more certain it appears that all species have been formed by a succession of bounds rather than by slow gradations; but it is to be assumed that the new species formed differed more widely from the parent than the segregates of *Oenothera Lamarckiana,* are known to do. We should be inclined to call these latter segregates, forms, and to deny them even the rank of a sub-species. It seems quite probable that every good species is like *O. Lamarckiana,* constantly throwing out these embryo species; indeed the whole theory of evolution is based upon this supposition. Darwin was of the opinion that the changes were small and successive; the later idea is that they are much greater and the forms fixed when once a change is made. In either event, as shown by the article in question, unless the conditions are favorable, the tentative species perish and leave no sign. The difference is principally that the Darwinian theory conceives of the plants varying, because of influences from the outside, while the new one assumes that plants constantly vary but that outside influences are necessary to preserve the variations. It seems that here we have a very good criterion for the determination of species. If any of these new forms could live and thrive under normal conditions, we would call them species; if not, then they would be classed as varieties or forms. None of these segregates of *O. Lamarckiana* were able to form separate colonies, even in soil untenanted by the original species. It would occur to most students therefore, that they are merely equivalent to what are called "forms" in America. The whole subject is one of much interest, and botanists may find in the cultivation of other mutable species, a field for much original research.

The official organ of the "Wildflower Preservation Society of America" makes a bad matter worse by explaining that as soon as this second society was organized, it invited the original Boston Society to become one of its local branches! Some people will be inclined to wonder if the American Forestry Association and other societies received a similar invitation.

The Plant World, Washington, D. C., offers a prize of $10.00 for the best cover design for the magazine submitted before Nov. 1, 1902.

Mr. C. G. Lloyd has just issued a 44 page pamphlet illustrated with 80 figures on the Geasters or earth-stars of North America.

It is safe to say that no single student of the fungi is doing more than Mr. Lloyd to advance our knowledge of this group of plants, He has recently erected a new four story building of brick and stone in Cincinnati to be used as a museum and library which is estimated to be capable of holding nearly five hundred thousand specimens of puff-balls and allied plants.

Almost without exception our out-of-door books have been written in the Northeastern States and treat of the features of that part of the world written from the Yankee point of view. In "Next to the Ground" by Martha McCullough Williams we get a view of the seasons as they pass in the South, by one who has grown up in such surroundings and is thoroughly familiar with what she writes about. In the "foreword" the author says that "as one star differeth from another in glory, so does one field or wood or hedgerow differ from another." How much her fields differ from those of the New England and Middle States one perceives before he goes very far in the book. The very methods of tilling the soil and gathering the crops are different. In the chapters on "Ploughing," "Shooting" and the like, the author shows a knowledge of the subject that would do credit to a man while in other chapters the habits of insect, beast and bird are entertainingly set forth. She has even succeeded in making a most interesting chapter on "The Hog." When she touches upon the plants it is from an original point of view. "A clown among oaks is the black-jack, the genuine scrub oak. The trunk is so crooked woodsmen vow it takes it half an hour after it has been cut down to find out how it can lie still. It is knottier than it is crooked. * * As it grows, small branches develop all round, standing stiffly out at almost exact right angles. After a few years they die, but do not break off and have done with it. Instead they shed twigs, bark and sap-wood, yet persist as to the heart, standing out all along the trunk like bluntish iron pegs." The nature lover will certainly find this an agreeable change from the average book on such subjects. It is published by McClure, Phillips & Co., New York at $1.20 net.

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SOME NATIVE PLANTS OF VALUE.

BY CHARLES TURNBULL.

> "The clustering sumach flamed along a ledge,
> The life of ruddy Autumn filled its veins
> Deep growing masses glinting in the sun
> Redder than the wild strawberry, where it stains
> The woodland ways, mid light and shadow spun;
> A gorgeous dream, a color-draught divine,
> Spilled on the golden afternoon like wine."

In our autumnal perambulations we cannot fail to note the ruddy leaves and dark crimson spires of fruit in the spreading clumps of sumac (*Rhus*), strewn over the gray, boulder-covered hill. In that season when the bluejay screams in the wood and the nuts rattle down, it approaches the maple in the ruddiness of its foliage; but in the winter, no plant looks more desolate than it, standing forlorn and bare in the past season's dry and withered grass. It appears to be a gregarious member of the plant world and the colonies occupying long-abondoned fields or rocky hillsides, render considerable areas quite impenetrable. That solitary shrub is no doubt a hermit, or perhaps a pioneer that has thus boldly established himself and intends forming a new colony.

The commonest of the genus is the staghorn sumac (*R. typhina*) It is also the largest, often attaining the height of twenty feet, with extremely crooked, angular branches. The common name staghorn has reference to this very angularity. The tannin of the leaves imparts the tint of the brown hillsides to delicate leathers, but this principle is not so abundant as in the Italian sumac (*R. coriaria*). The wood is a splendid dark yellow having fine distinct markings and used sometimes in inlaid work. The species *copalina* or black sumac yields a kind of varnish.

After the trees are denuded of their scarlet splendor, and the woods are bleak and bare, we wander gravely through the groves or over the dusty roads, seeking almost vainly for some reminder of departed summer, a belated aster, a turtle head, or a frost-nipped gentian. The dark green Christmas fern (*Polystichum acrostichoides*), has a very certain beauty new, and how familiar the rough twisting rope of wild grape appears. In summer its foilage we never saw---only the brown shaggy vine--and its appearance is now unchanged. By the aid of a friendly chestnut, it rears its head so loftily and ripens its fruit with the fruit of the giants of the wood. It is to be regretted that sometime, no doubt through fear of a tumble to earth, it is induced to lay too firm and fast a grip on its host, often so tightly that it slowly strangles its friend, like a giant in the toils of a serpent.

The flowers are green and unconspicuous, but they amply compensate for their lack of beauty by their fullness of fragrance. A grape or a basswood may be perceived by its fragrance a considerable distance away, and there is probably no other wild vegetable odors so intoxicatingly fragrant and possessing their power of expansion.

A common wild grape is (*Vistis labrusca*), and one of the most valuable of the species indiginous to this continent. The dandies of the gardens and vineyards trace their ancestry to this honest backwoods stock. By reason of its hardiness and freedom from disease it is even replacing the European species, *Vinefera,* in the vineyards of the old world. The rich expressed juice, after a proper sojourn in the cellar is converted into good prime wine and the excellence of the crushed skins as a jelly or tart needs no commendation. Old fashioned cider-makers maintain that a bunch of the small frost grapes (*V. cordifolia*), dropped into a barrel of fresh sweet cider mellows its flavor and prevents hardening.

Along the thicket lined roads towards the latter part of the month of June, the breeze is laden with the fragrance of the elder (*Sambucus.*) A week later the ground is cloaked with the cast-off corollas, and by the last of August the full clusters of blue black fruit are proper for manufacture into the country housewife's aperient and diuretic elderberry wine. Wood of two years' growth is adaptable to the making of cobbler's pegs. The pithy first year wood provides a weapon for young Nimrod, the elder-gun or pop gun. The old Romans constructed a musical instrument, the sambuca from its wood and this circumstance gives the genus the name of *Sambucus*.

Hartford, Conn.

AILANTHUS.

BY PROF. WILLIAM WHITMAN BAILEY.

In describing this exotic tree, now so well established and so familiar, the late Dr. Asa Gray said: "It is called by Arabs the tree of Heaven, but is redolent of any other odors than those of Paradise." His remarks has reference to the atrocious smell of the staminate or male tree when in flower. The pistillate tree, for some reason less often seen, is on the contrary odorless. One knowing this, can freely grow the tree with all its advantages and none of its drawbacks. The good qualities consist in the extreme rapidity of growth, the comparative cleanliness and freedom from attack of insects and the picturesque and almost tropical beauty of the plant.

So vigorous is the tree, and so energetic in spreading itself, that the future New Zealander fresh from taking Kodak views of St. Paul's cathedral, and gazing meditatively upon what remains of our Wall street, would, it is surmised, find New York overgrown with ailanthus. So light are the seeds--or rather fruits, winged like those of the ash, that they fly about every where, and sprout on roofs, in gutters and at every point of vantage,

"Where they most breed and haunt, I have observed
The air is delicate."

Let a street or park be deserted and at once it is over-run with ailanthus. Indeed, the tree has been employed on the western plains to insure a rapid arboreous growth.

It has been spoken of as a clean tree, little attacked by insects, While that is true of some parts of the country, about New York in its wider sense, we find the ailanthus fed upon by a large, and to the nervous, a repellant looking caterpillar. This is the handsome larva of *Attacus Cynthia*, the well known silk worm of Japan and China and one of the most superb of moths, measuring several inches across. This magnificent creature is painted with delicate shades and bands of olive green and lavender, and is a joy to behold. The caterpillar is equally beautiful after the observer rids himself of inherited dread and prejudice. These moths absolutely swarm in certain years in Greater New York. We have never seen them in Rhode Island, though the tree is not infrequent in our city streets, and is abundant about Narragansett Pier, Newport, and Seaconnet.

Its tropical beauty has been spoken of. This is due to a certain quaint and apple-tree-like pose of the trunks, and to the ample sumac-like pinnate foliage. These compound leaves are often two feet long. The fruit as it ripens, in most places, becomes yellowish and rather attractive. At Gloucester, Mass., and on Cape Anne generally, I have been surprised to see it of a magnificent red, as fine as that of the mountain ash. Salt air seems to affect color, as witness the superior brilliance of roses at Newport.

The plants kept low, and grown with spiraeas, clethra, and other flowering shrubs form an exquisite border. Its German name is Gotter-baum, "tree of the Gods," said to be a translation of it's Indian name, ailanto. The French call it *Vernis du Japon.* We occasionally observe trees thirty or forty feet in height. In Europe, where it has been grown longer, the tree is sometimes fully sixty feet high. The family Simarubaceae to which the ailanthus belongs, has with us no other representative, though the rue, the prickly ash and even the orange and lemon are not distant relations.

Brown University, Providence, R. I.

An American lover of flowers, on visiting England for the first time soon notices two interesting facts, namely, that many of our favorite garden plants grow there by the road, while inside the wall not a few of our common wildings are carefully cherished in cultivation. Thus in an English countryside purple foxglove, Johnny-jump-ups and scabious are plebeians of the fence rows and pastures, while goldenrod and five-leaved American ivy and rhododendron are aristocrats of the gardens.—*S.*

HABITS OF THE TWIN FLOWER.

By Elsie Murray.

> "Beneath dim aisles, in odorous beds
> The slight Linnaea hangs its twin-born heads."

quotes Mrs. Dana; and there is more about the "deep, cool, mossy woods of the North" that are its favored haunts. Ever since I first read those lines I have been looking for the *Linnaea* in the deepest, coolest, mossiest woods I know. I suppose it is the irony of Fate, that in all the twenty odd square miles thus explored, I should have found it by dusty roadsides only, in some dozen different places--and by the merest chance at that--with seldom even a remnant of woodland behind it, to form the background, fancy had pictured.

Once found, however, it may easily be forgiven the most prosaic surroundings. Surely the favor of the great Linnaeus was not misplaced in this charming little flower, with its tiny drooping bells, whose downy rose-pink lining and whose delicate helitrope odor one must nevertheless, bend low to notice and appreciate.

My acquaintance with the *Linnaea* in my own locality--a river county in Northern Pennsylvania, where it had long been proclaimed either extremely rare or extinct--runs back a few years only. Some years ago I discovered, in an old herbarium that I had collected on the nearby hills in my childhood, a single spray of what proved to be the highly prized *Linnaea.* From that hour vague recollections of shadowy woods where as children we tore up great mats of the tiny creeper to weave into fairy wreaths, have haunted me, and June after June I have searched diligently, to find it at last by pure accident some three or four years ago, along one of the roadsides before mentioned.

Such a brief acquaintance hardly affords a basis for the explanation of a fact in twin flower's life history that has recently come under my notice. During the second week of September, 1902, the *Linnaea,* in at least two spots several miles apart in my county, indulged itself in a second season of blooming. In so doing, did it obey a definitly fixed habit, or did it yield to an unusually favorable season, and double its annual output of flowers? About the same time, the *Cornus paniculata* and *Houstonia caerulea* also, set rather anonalously, to flowering again. But the case of the *Linnaea* seems the more phenomenal, in that its flowering season in June is extremely short in comparison with the others mentioned. In a season which seems to have been unusually favorable to the wild flowers from the mountain laurel to the asters, it is possible that the *Linnaea* gathered strength to double its flowering period. Did it do so through any considerable range of territory? Or was the occurrence noted simply a customary incident in the annual activities of the *Linnaea,* that had hitherto escaped my attention?

WINTER BLOOMING FLOWERS.

BY ELLA F. MOSBY.

They are not all winter flowers that I shall tell of, for the shepherd's purse, chickweed and henbit also bloom in spring and summer. The henbit is of the mint family and would be thought a lovely flower if it were only larger. Probably you often see it by a brook and do not notice it. The tiny blossoms are clustered in a graceful whorl around the stem and are all of violet hue except the lower lip, which is white with purple or violet spots, "fairy favors" as Puck might call them. The leaves have a fresh aromatic odor and are prettily and variously shaped, the middle ones heart-shaped with scalloped edges like many geraniums. One may often find these dainty blossoms on a winter day.

Another winter bloomer is the shepherd's purse, named from the odd three-cornered pouches of seed. It has a small white blossom. The little chickweed or starwort looks very fair when it covers the ground thickly with its small white stars in the most wintry season. No doubt it was one of these that John Burroughs speaks of as "a microscopic white flower" which he found blooming near Washington in midwinter.

Skunk cabbage and witch hazel belong to cold weather. The buds of the first are formed early and stand ready in winter for the first possible moment to unfold. They grow in swamps and their leaves show "like so many great emeralds above the black ooze." Bees welcome the blossoms, and get a good supply of sweetness from the pollen of the large flowers before even the arbutus makes the air delicious with hidden clusters. The leaves of the witch hazel fall early, and its blossoms are seen on bare branches. "It is curious to notice this tough, angular, ugly skeleton of a shrub, studded with yellow-green flowers, whose petals are like ribbons and shine against the sun as golden stars." Thoreau says that while the tall hazels are bare of foliage, he found leaves on the low bushes as full of color as the blossoms, some clear lemon yellow inside the bush and a richer hue outside, while others were crimson, or green veined with gold.

The yellow disks of the dandelion may be found all the winter long in sheltered places, cuddled close and flat against the bosom of Mother Earth like a timid child. It does this to retain warmth as the winter honeysuckle covers its buds with close-fitting scales and the early hepatica swathes its nurslings in woolly or fuzzy wrappers.

Lynchburg, Va.

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

A FEW BEETS.--A pile of beets 15 feet deep, 120 feet wide and a quarter of a mile long was to be seen at a Colorado sugar factory recently. This beats the beet record for the season.

STAGHORN SUMAC.--The common name of *Rhus typhina* is usually supposed to have been given in reference to the soft velvety covering of the young branches like the budding horns of a deer. In this issue another origin for the name is suggested, which is equally appropriate.

IRREGULAR OCCURRENCES OF GENTIAN.--The beautiful fringed gentian (*crinita*) is very abundant in my locality; but blossoms are comparatively few on alternate years. Is it so elsewhere? *J. A. Bates So. Royalston, Mass.* [The plant seems to vary its behavior with the locality. We have yet to find out why it is not so common in some years as in others.--ED.]

A SEED DEFINED.--Most of us know a seed when we see it, but to give a definition that will exactly describe a seed is not easy. Here is one taken from the September *Botanical Gazette.* "A seed is an ultimate, trigenerational, symbiotic unit in the plant life-history, integrated from tissues and structures belonging to two sporophytic generations and the intervening gametophytic phase."

DOES SELAGINELLA BEAR SEEDS?--The *Selaginellas* are among the higher cryptogams and so of course do not normally bear seeds. Certain megasporangia, however, have been observed to remain for a long time on the plants, and in this condition, their spores having germinated and the eggs having been fecundated, they assume the character of seeds according to Prof. Conway Mac Millan.

VARIATION IN PLANTS.--Variations in shape, color and size of plants, flowers and fruits do certainly sometimes result from outside influences as fertilizing wild flowers with old tin cans will prove. Some limited observations have suggested the question if position on the plant does not cause some of this variation. Is the lower, first ripening fruit (e. g. tomato or pea) usually the largest and best or nearest to the type of the improved variety? --*J. A. Bates, So. Royalston, Mass.*

THE FRUIT OF AMERICAN YEW.--The fruit of the ground hemlock or American yew (*Taxus Canadensis*) is usually regarded as poisonous. This has kept most botanists from tasting it and the fact does not seem to be generally known that the scarlet pulp surrounding the seed is quite sweet. Although the belief in the poisonous properties of this plant is widespread, the makers of our botanies are silent on the subject. Can any of our readers tell whether it is really poisonous or not?

LARGE FOREST TREE NURSERIES.--According to *Forestry and Irrigation* the State of New York has established two nurseries for growing young forest trees which are of note from the number of plants they will contain. One in the Catskill region is planned for raising two million seedlings; the other in the Adirondacks will be capable of growing three million. The trees are to be used in the State's re-foresting work. Two parties are now in the forests attempting to gather enough seed of the species desired to fill the nurseries.

UNUSUAL PLANT NAMES.--Referring to the puzzling plant names in the August number, Rev. James A. Bates of South Royalston, Mass., writes as follows regarding the term, "crackers" applied to the huckleberry. "We call the black huckleberry (*Gaylussaccia resinosa*) 'black snaps.' Eat them and the seeds snap. They are now (Sept. 26) just passing their prime with us--the last of our edible berries except the cranberry and wintergreen." Without doubt "crackers" refers to these same snapping seeds. As to universe vine applied to the bearberry (*Arctostaphyllos uva-ursa*) it is probably another popular attempt at making English out of the specific name.

NOMENCLATURE AND TAXES.--There is in France a positive prohibition of the general cultivation of tobacco plants, the growing and selling of tobacco being a Government monopoly. This prohibition applies to gardens and greenhouses, and no ornamental uses may be made of the *Nicotianas,* notwithstanding that all are not used for the manufacture of "the weed." A curious result of botanical revision complicates matters. *Nicotiana colossea* of Andre is thus excluded from gardens, although not used in manufacture. It was formerly known as *Lehmannia colossea,* Sprengel. The question may be asked, could the plant be grown if the old time nomenclature had been maintained? The grouping together of closely allied genera is responsible.—*Indian Gardening.*

WHICH IS THE LIGHTEST WOOD?--Cannot someone settle the question as to which is the lightest wood? *Leitneria floridana* stands .207 and *Ochroma lagopus* has been reported both as .25 and as .12. And is *Condela ferria* surely the heaviest--at 1.302? *O. W. Barrett, Mayaguez, Porto Rico.* [The Florida lightwood (*Leitneria Floridana*) has thus far been regarded as the lightest known wood. The wood of the roots is said to have a specific gravity of .151. Since it can not readily be imagined just how light this is, it may be added that common cork has a specific gravity of .24, the willows and poplars range from .37 to .60, the white cedar stands at .332, the white oak at. .747 and some of the hickories at .83-- the latter four times as heavy as lightwood.--ED.]

INACCURATE BOTANY.--If one would have proof of how much the botanical manuals and even our popular books are made in the herbarium instead of the field, let him compare their statements about plants with the plants themselves. Take the berry of the false Solomon's-seal (*Smilacina racemosa*) for instance. All the books from Britton to Dana, including Gray, Wood, Lounsberry and no one knows how many more, speak of the berry as being pale red speckled with purple. F. Schuyler Mathews seems to be the only one who has really described the berry as it is. He says "The berries, smaller than peas, are at first greenish, then yellowish white, speckled with madder brown and finally in late September, a dull ruby-red of translucent character." This is exactly the case. When the berries are really ripe they are unspotted. Those who have described them as speckled have seen only unripe fruit!

A POISONOUS HORSETAIL.--The Vermont Agricultural Experiment Station has published as Bulletin No. 95 (June, 1902) an interesting report by F. A. Rich and L. R. Jones, on the reputed poisonous properties of the common meadow horsetail (*Equisetum arvense*), often known among Vermont farmers as foxtail. Facts personally gathered during several years and the results of experiments conducted at the State Station at Burlington lead the authors to aver that this common plant when dried, as in hay, is dangerously poisonous to horses, causing death if its use is persisted in. An odd fact, which the report mentions, is that horses will develop a depraved appetite for the equisetum and eat it in preference to good timothy or even grain. There is no evidence that the green plant eaten in pasture affects them injuriously. Cows eat the horsetail hay with apparent impunity, but the testimony with regard to sheep is contradictory.

THE "ORNITHOLOGIST AND BOTANIST."--Ten years ago, there was published in Binghamton, a monthly journal devoted to birds and flowers called the *Ornithologist and Botanist*. The combined ages of editor and publisher were less than forty years, and one year of that particular brand of "the strenuous life" was enough to satisfy. There still remain several sets of this volume complete except the first three numbers, and the contents are still of interest. The publication was the first "official organ" of the Gray Memorial Botanical Chapter. On this account it is possible some of our readers would like a set since most of the chapter members are on our subscription lists. We therefore offer to send a set of the journal (72 pages) to anyone who will send us ten cents in stamps to pay for postage and the time required in going up into the attic where they are stored after them. Address THE AMERICAN BOTANIST.

MULBERRIES AND THIMBLEBERRIES.—My mother, who was a New England woman, states that in New Hampshire and Massachusetts, when she was a child, the red raspberries were called mulberries, and the blackberries thimbleberries. Also the common hickory nut was there called walnut and the butternut was called oilnut, on account of its oily nature.—*Elma Iona Locke, Berlin, Wis.*

ASPLENIUM EBENOIDES A HYBRID.—It has often been suggested that this fern is a hybrid between the walking fern (*Camptosorus rhizophyllus*) and the ebony spleenwort (*Asplenium ebeneum*), but proof has always been lacking. This is not the case, at present, for Miss Margaret Slosson has recently successfully crossed these two species, producing forms similar to the form in question. One of the remarkable things connected with the experiment, is that the species crossed belong to different genera. It is also interesting to note that the very species suggested as the probable parents, prove to be the right ones.

THE OPENING OF A MOONFLOWER.—It is seldom one can "see a plant grow," but it is sometimes possible to perceive the movement of an opening blossom. Last evening we watched the moonflowers open. At half past five there were several buds ready to open. At a quarter to seven they had changed butl ittle, but before seven o'clock two or three had opened to nearly or quite full. One opened slowly, but one could see a steady movement as the flower expanded; others were helped by the wind blowing into them, so their movements were quicker and less continuous. It was a very interesting sight.—*Elma Iona Locke, Berlin, Wis.*

LAST ROSE OF SUMMER.—Mr. James A. Graves, Susquehanna, Pa., notes that in portions of Northern Pennsylvania the New England aster (*Aster Novæ-Angliae*) is much cultivated in dooryards and goes by the name of "the last rose of summer." In the same region the usual name of aster is seldom applied to this plant, probably being reserved for the exotics of the flower garden. Although single blossoms of cultivated asters outrival those of this hardy native, there are few plants of late summer that can be compared with a clump of it in full bloom. It is a desirable addition to any flower garden.

MORE EXTINCT SPECIES.--Those not personally interested in the combat, must derive no little amusement from the species tinkering so much in evidence at present. The species makers are not having it all their own way, as at first, but as soon as one botanist has set up a long line of new species another of the same craft rises up and knocks them over. The latest to go are some twenty species of the genus *Nemophila* to which the well-known "baby-blue-eyes" belongs. H. P. Chandler says in the September *Botanical Gazette*: "An almost infinite variation makes an accurate limitation of species absolutely impossible. Were these all described they would fill a volume, but nothing would be gained thereby. Convenience should be the aim of classification and this aim is most effectually defeated by the multiplication of uncertain species." The opinions held upon this subject by Mr. Chandler seem to be gaining ground among thoughtful botanists and a large number of our most cherished new species appear to be on the verge of extinction in consequence.

HOW THE INDIAN PIPE LIVES.--An interesting feature in its life history is the comparatively modern discovery that it is not, as formerly supposed, a saprophyte, living on humus deposited by decaying leaves; but is, after all a root parasite, with a fungus for the host plant. For this the term symbiosis has been constructed--literally, plants living together. But they do more than this. It is supposed they are essential to each other's existence. This may be correct so far as the *Monotropa* is concerned. We find the dense ball of roots closely interwoven with the mycelium of a fungus--but evidently the same fungus is abundant in the rotting leaves around without any Indian pipe growing with them, and owing nothing to the "pipe" as symbiosis would imply. There is yet much to be learned about the behavior of these plants: *Sarcodes sanguinea, Hypopitys* and *Monotropa* all seem to have their "elaborated food" from the same fungus and are yet all essentially different in color, and may therefore be reasonably charged with some hand in the elaboration--*Meehan's Monthly*

THE OPENING OF FLOWERS.--There still seems to be much to learn about the conditions which govern the opening and closing of certain flowers. The four o'clocks of our gardens are so named because they open very close to the hour of four in the afternoon, but late in summer, their ideas of time become sadly confused. , They then are late in opening and do not close much before noon the following day. The morning glories, too, which early in the season close by mid-day, in September would justify the name of all day glories often remaining open until dusk. Scientists are fond of telling us that the opening of the flowers, and their odors and colors are all adjusted to the wants of various insects, but it is probable that certain amounts of light and heat are fully as potent factors in developing fragrance, nectar and color. The behavior of the four-o'clocks and morning glories would seem to indicate that their opening and closing is not altogether with reference to insects. And what shall be said of the Goat's-beard (*Tragopogon pratensis*) which as soon as noon comes, promptly shuts up shop for the day regardless of the fact that its insect customers are then abroad in the greatest numbers.

ODOR OF CATALPA LEAVES.--I have examined several catalpa trees since reading Mr. C. F. Saunders' note in the July issue of the BOTANIST, and in each instance found the terminal leaves of the branches "strongly scented." No odor was perceptible from the older leaves, neither did crushing them in my hand develop any. From which I conclude that only the new leaves at the ends of the branches are *strongly scented*. It is singular that this characteristic of the leaves should have been seemingly overlooked by our botanists, or, perhaps if known, was not thought worth the mention. The specimens I looked at, were doubtless *Catalpa bignonioides,* as that species is the one generally found growing on our Northern lawns. It is the species mentioned in "Illustrated Flora" and Britton's new Manual as having stronger scented leaves than *C. speciosa,* the other member of the family. Possibly the two species may be distinguished by the odor emitted from the terminal leaves. Some of the trees gave off a stronger odor than others. Catalpa leaves also afford a striking example of shrinkage in drying, the loss in size being about 45 per cent or nearly half. Consequently, if anything like accurate measurements were wanted, herbarium specimens would fall much short of the actual size when green.--*James A. Graves, Susquehanna, Pa.*

COMMON NAMES FOR PLANTS.—Every nurseryman and florist knows that much of a plant's popularity depends upon its possessing a good common name. A lady recently wrote to our esteemed contemporary, *The Florists' Exchange,* about a plant of *Aralia spinosa* which they figured and gave its common name as well as its botanical appellation. Certainly the common name of "Devil's Walking Stick" is not a nice name, especially for a plant belonging to a lady. This sensitive dame wrote to the editor complaining that she liked the plant but would not think of owning anything with a name like that. He was not cornered, for, in replying, he referred to the plant as the Angelica tree—a name used by old gardeners. No doubt by this time the little prejudice against the name has been removed, and she is now the proud possessor of an *Aralia spinosa,* alias Devil's Walking Stick, alias Angelica tree. This is as good as the lady who was most profuse in her remarks of admiration for a tree of *Cercis Siliquastrum,* which she saw in full bloom and immediately ordered one, but on learning that its common name was The Judas Tree she cancelled her order, saying that it was no fit tree for a vicarage garden.—*Gardening World.*

CROSS-POLLENATION IN THE MONKEY FLOWER.—In connection with the subject of cross-fertilization, a singular behavior of our plant (*Mimulus ringens*) has been referred to this supposed arrangement. The stigma is formed of two thin plates which are irritable like the leaves of the sensitive plant. About the time when the pistil is ready to receive the pollen, these plates expand. When touched by any foreign substance, the plates slowly close. Usually in plants of this order the anthers mature their pollen before the pistil has finished its growth. Pushing through with the plates closed, it is assumed that it prevents the deposition of its own pollen on the inner receptive surfaces. An insect visits the flower while the plates are expanded, depositing the foreign pollen, and the plates then close, giving the introduced pollen a chance to develop its tubes. This is the hypothesis. There seems, however, to be no record of any actual experiments or close observation on this point,—and there is yet a good opportunity for the student of plant-life to discover new laws. The peculiar behaviors of plants are often of service to the student in matters of classification. Some botanists place the order of Trumpet-flowers, *Bignoniaceae,* very close to the order of *Scrophulariaceae,* in which *Mimulus* is placed. Some species of the former family have thin, irritable plates for the stigma just as *Mimulus* has, indicating that the close relationship botanists have supposed is correct.—*Meehans' Monthly.*

STONECROPS AS LIGHTNING CONDUCTORS.—The name of this family (*Sedum*) is suggestive, for the plants sit patiently on during the extremes of heat and cold. Bentley enumerates thirteen British species. The most frequent are *S. tectorum* and *S. acre,* possessed of very opposite qualities. The former plant enjoys a curative reputation amongst old wives and herbalists. Since the introduction of slates the sight of a red-tiled cottage covered with this *Sedum* has become rare--at least in the neighborhood of populous towns. Sixty years since it added very much to the picturesque beauty of many a roof in the Lake District. When pedestrianizing in company with a brother pharmacist we admired a fine display on the roof and outbuildings of a farmhouse. The tenant, an aged, but hale and hearty lady of primitive manners, volunteered the information that a building was thereby protected from thunderstorms, and that "this very house was saved by its intervention. In my grandfather's time the lightning struck the roof and turned the thunder-flower all to a jelly; but the housewas saved,and that iswhyit is called thunder-flower" Some twenty years after, when traveling on the continent, this *Sedum* was noticed growing abundantly upon many a housetop in Belgium, where it was known as "Dunderblomen;" at Arras, in France, it was styled "Fleur de Tonnerre" It is remarkable that this humble plant should be thus recognized in places so remote from each other, and it might be of interest to lovers of plant-lore to investigate the subject, and if possible extract the extent and origin of the legend, which may date from remote antiquity.—*Pharmaceutical Journal.*

THE RIPENING OF MITCHELLA REPENS.—The note in the July issue referring to the ripening of *Gaulthera procumbens* and *Mitchella repens* fruit under the snow somewhat surprised me, and while not sufficiently familiar with the fruit of the former to venture an opinion, recollection, and personal observation of the latter since the note was read, do not confirm the statement.

The berries persist through the winter and spring, but I recall that shortly before the flowering season, in July, they were few and badly shriveled. Early in September I went over the old grounds to ascertain if possible the time of ripening. Some of the berries were green and only half-grown; others were partially reddened, proving that not all wait for the snows to fall; in a few places large, bright scarlet berries gleamed forth in profusion. Of course I am not able to say positively that these are not old berries rejuvenated by the copious rains of the past summer. Yet if memory serves aright they are now in greater abundance than in June. Numerous specimens partly reddened and some almost completely colored prove that not even frost is necessary for their maturity, consequently I still cling to my original supposition that *Mitchella* ripens its fruit in autumn; that unless picked it is persistent until shortly before the blooming season of the next year. Though berries and flowers are not uncommonly found together, the shriveled appearance of the former at this time seems rather against the theory that any considerable proportion of the berries survive a second year.—*Bessie L. Putnam Conneant Lake, Pa.* [Observations of this kind are of much interest. It is probable we shall soon be able to settle this berry question.--ED.]

THE GROUND-NUT IN CULTIVATION.—Two years ago I took up two tubers of the ground-nut (*Apios tuberosa*) from the stony shore of Lake Champlain where there seemed to be no earth for food and where they were under water at the time of the spring floods. I placed them in ground that is under cultivation, and that is enriched each year by a top dressing in the fall. Last year I had two fine plants. The stems which must have been five or six feet long, clambered up over some brush put in for their support. The leaves were large and very dark rich green in color, while the blossom clusters, one for almost every leaf axil, were all that could be asked for. One would have been obliged to hunt a long time to find any plants that equaled these. This year I have thirteen plants instead of two. One of the old plants failed to come up but the other is doing better than last year. The other plants are grouped around within a radius of eighteen inches. Some of the stems must be fully eight feet long and they make a very pretty show as they clamber over a large scraggy branch. The foliage shows no signs of deterioration while the flower clusters are considerably larger than those of the preceding season. From this experience of the past two years, I am inclined to think that plants will not only grow, but will improve under cultivation. If they multiply as fast next year the trouble will be to keep them from growing rather than to get them to grow.--*Eunice D. Smith, Barre, Vt.* [If our correspondent has not yet observed it, she will be interested in the plant's methods of securing cross-pollenation--one of the most ingenious methods to be found among our common plants. It is also to be noted that notwithstanding this machinery for cross-pollenation, ground-nut seeds are among the rarities. The reason for this is supposed to be that the plant being able to spread so rapidly underground finds little use for seed.--ED.]

EDITORIAL.

Some days ago, the editor came across a most curious collection consisting of nearly thirteen thousand buttons no two of which are alike. In getting this immense number of different forms together, the owner has spared neither time nor money and the unique result is something with which the button strings of childhood days, are not to be compared. The very immensity of the task of sorting out and arranging all those buttons gives the collection a touch both of importance and value and the owner is justly proud of the fact. But as string followed string in seemingly endless procession, one could not help reflecting upon the vast amount of energy that had here gone to waste. Years of work and correspondence and the dollars that make these possible all summed up in a great pile of buttons! A similar devotion to any branch of natural science would have made the student an authority; a like enthusiasm for scientific collecting would have formed a collection that even the authorities would have been glad to consult. But before we condemn the button-collector it would be well, perhaps, to see if we have not as useless a collection of our own. What of the plant lover who is constantly seeing new or interesting traits in his favorites, but neglects to make them known to others? Is his knowledge anything more to the rest of us than a string of buttons? And the man who is so eager to collect new material that he never has time to properly arrange what has already been collected--of what greater value to his generation is such material? And the one who disputes over obscure points in nomenclature, and the mere gatherer of botanical facts--but why continue when the moral of the sermon is in full view? If we would turn our leisure to good account, we must not only take up something of permanent interest, but must make the results of our labors known to others. And in this direction there is nothing at once so attractive and so full of promise as the study of botany.

Now is the time to select your wild shrubs and trees for the lawn and garden. It is much better to transplant such things in autumn than at any other season. Growth has ceased and if they are moved now and properly planted, they will be ready in spring to throw out new roots and leaves with scarcely a perceptible halt. It is an excellent thing to have specimens of our wild shrubs near at hand for study at all seasons. If for lack of space or other reasons you cannot have representatives of every desirable species you will make no mistake in selecting such things as are conspicuous in both flower and fruit. The wild crab-apple may be planted quite as much for its fragrant, greasy apples as for its delightful blossoms. The wild plum, the beach plum, the June-berry, the frost grape, and the elder have each two seasons when they command out attention; in one pleasant to the eye, in the other agreeable to the palate. Still others with inedible fruits are desirable because of the bright display this fruit makes in the dull days of late autumn and winter. Among them may be named the flowering dogwood, the barberry, the hawthorn, the chokeberry, the sumac, the viburnum and the fly honeysuckle. Most of these may be purchased of the nursery men, but the editor likes to shoulder pick and shovel and get his specimens at first hand. Digging about their roots and finding out how they are anchored to the soil, is found to be an excellent way of beginning their acquaintance, and moreover it forms a substantial foundation upon which to build a subsequent knowledge of the plant's life.

The Plant World, having begun publication in 1897, announces that the September number will be its "wooden wedding" and that it will publish a portrait and biography of its senior editor as appropriate to the occasion! Such discrimination, however, appears quite unnecessary, in view of the kind of anniversary celebrated.

Herbarium making is a serious business. It calls for the expenditure of large amounts of time and a fairly large amount of money. It is therefore well for the young botanizer to consider the subject carefully before wasting his precious time in mummifying plants to be stowed away in dusty pigeon-holes. I do not mean to disparage in any way the accumulation of plants by museums, universities and botanical gardens for these collections are invaluable to the student, but I would point out, that so long as we have these vast collections of plants easily accessible, it is a downright waste of time for the ordinary botanist to make a general herbarium. The collection mania is one of the first indications of a scientific bent and must be indulged; but it is well to confine the collection within certain sensible bounds. If you are making a "dead set" at the flora of your region, make an herbarium specimen of every species, sub-species and form encountered and to these add related species from adjacent districts by exchange. If you are interested in certain families of plants, collect not only every species and form, belonging to that family, but the fruit and roots and seed, also. Make other specimens to show each species in all important stages from seedling to maturity and get by exchange the same species from as many distant points as possible. If interested more in the esthetical side of botany, a small herbarium consisting principally of the showy or curious flowers, fruits and leaves of your locality will be excellent. The great collections are still none too rich in rare plants and their curators will be glad of such specimens as you may find; but it is worse than useless to go on collecting all sorts of common plants and adding other common plants by exchange for the sake of having a large herbarium. Better, far, a small herbarium well studied, than a large one upon which the dust continues to collect.

C. H. Bissell and Luman Andrews have recently issued a very creditable "Flora of the Town of Southington, Conn., and its Vicinity," which is published by the State Board of Education. The area covered is about 36 square miles and the authors find 1,200 different species growing without cultivation, a very large number in comparison with similar areas elsewhere.

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HOW THE TURKEY MULLEIN LIVES.

BY M. F. BRADSHAW.

In this "land of sunshine" and winter rains, where the earth grows yellow and brown from May to November, one would hardly look for fall flowers. Indeed a superficial glance over the hillsides and plains would cause most people to say there were none and that the earth was bare.

But I think a close inspection of these bare places would constrain them to acknowledge there were many plants--some even pretty. A student finds more than this, for these dry-weather plants are among the clever ones of the earth.

Clever they are, because they have chosen a time when there is little competition for room and sunshine; they can spread themselves out in exactly the shape they like best, with no tall neighbor to overtop and shade them. Clever in their methods of self-protection and reproduction, and successful in life as well, for there never was a drought that discouraged them.

Let us look at one *Ereomocarpus setigera,* called "turkey mullen," "turkey weed," "poverty weed," "tar weed" and I don't know how many other local names. It is one of the euphorbia family, and quite the most numerous, though its relations are by no means few here.

It grows prostrate, fastened to the dry earth by a slender root and looks almost as if it could do quite as well without any so inadequate does the root appear. I say prostrate, though in favorable situations, such as cultivated land it looks up and attains a foot or more in height. However, in the hard, sun-baked earth of the plains or slopes of the lower hills, it seems to be most at home and here it lies quite flat. Its color is gray-green, the small clusters of flowers surrounded by leaves of the same color, and only noticable by the protruding white anthers. The whole plant is really graceful and so thriving and healthy and perfect in every part that it is certain to be admired when one sees it--which most people do not.

Pick a branch and you have doubts after all whether it is to be admired, for it is closely covered with harsh hairs that are anything but pleasant to touch. It is also sticky and the smell is decidedly objectionable. Be assured; it does not sting or poison, and well repays close acquaintance. These hairs, placed under an ordinary pocket lens are most wonderfully arranged; set in bundles like cluster of many needles with a hat pin in the center. The hairs seen with the naked eye are the long ones only.

These hairs are thickly interlaced and serve several very useful purposes, the first of which may be protection from sheep or other grazing animals, for in this dry, bare season food is scarce and everything available is cropped. Then they protect the epidermis from dust which otherwise in this country would quickly choke the pores; and they supply the plant with water. Look at a turkey weed any dewy or foggy morning and see how thickly the drops of water are set on these hairs; pick a branch and see how heavy. By experiment the leaves have been found to double their own weight and with a microscope the water can be seen to enter the hairs; that is why the plant grows and blooms and matures seed, with no rain, soil dry and hard and a continuous blaze of hot sunshine.

The unpleasant, acrid smell probably is another device for keeping away grazing animals for it is said that sheep when starving will not eat the plant. In the latter part of July or August it makes its appearance and by the end of October it has lived its life.

Orange Cal.

EXPERIMENTS WITH THE FRINGED GENTIAN.

By Chas. C. Plitt.

In the Note and Comment department of the September Botanist, Mr. J. A. Bates notes the irregular occurrence of *Gentiana crinita* and "that the blossoms are comparatively few on alternate years." I have noted the same irregularity here in the vicinity of Baltimore, and offer the following, which tends to show that the plant is a *biennial* and not an *annual* as stated in Gray and also in Britton and Brown, as the explanation.

When I first noted this irregularity, I thought it was mainly due to the terrible onslaughts the plant receives when in bloom, for I had noted several times that every plant in sight had been gathered, but a florist friend thought it was because the plant was a biennial.

As no plant can stand such treatment and not be exterminated, I decided to transplant a few to some secret place.

This was done three years ago. My transplanting was a success and the plants ripened their capsules and disseminated their seed. The next year, (two years ago), I visited the spot, hoping to find plants that had grown from the disseminated seed, but I did not find a single one. Thinking that my transplating had been a failure, I decided to try again, this time with about a dozen plants. The plants were planted on the same hillside, but in three sections, one above the other, and about twenty feet apart.

Unfortunately my first section was planted close to the spot where the plants of the preceding year had stood. This I recognized the next year when I visited my "Gentian Place," for far down the hillside, where I had transplanted the plants two years ago, stood as beautiful a plant as one would care to see, with sixteen fine blossoms. It was not discovered by any one and ripened its seeds. I examined the spots where the other sections had been planted, but no other plants were found. I was now in a quandary for I could not tell if my plant had grown from a seed disseminated last year or from one disseminated two years ago. You may be sure that I anxiously awaited results this year.

Early in August I was on the look-out for plants, and the discovery of seventeen pretty little plants at the foot of the hill, was hailed with delight. In the middle of September the plants were in bud and two weeks later in flower.

Again, the hillside is examined for I now thought of the spots where I had transplanted the plants two years ago. In a few minutes, I, full of expectation, reached the first spot. What a pleasant treat was there awaiting me--eighteen fine plants in full bloom! I stopped only long enough to count the plants, and then hastened to the other spot higher up the hill and here again were the Gentians--ten more fine plants.

I think my experiments show almost to a certainty that the plant is biennial, at any rate in this latitude. To make doubly sure, however, I am trying my experiments all over again, this time in two different localities. I might, here also mention Mr. J. Ford Semper's experiment. Mr. Semper's home is Aikin, Md. Two years ago he planted seed of *G. crinita.* A number of the seeds germinated, but of the lot only one plant reached maturity, blooming this year.

Baltimore, Md.

CAMP FOLLOWERS OF THE FOREST FIRE.

BY ELSIE MURRAY.

There are certain fire-swept mountain stretches, solemn, lonesome in the early twilight, when the scant moonbeams struggle raggedly over their desolation that seem far-reaching barrens, pathetic, but for the grandeur of the towering grey skeletons, stripped of leaf and bark and silent save for the passionate, despairing cry of the whip-poor-will.

But revisit the scene in the gay whirl of a summer's morning and presto! change! You'll find the *genius loci* has dropped her tragic mask and the very spirit of comedy is tripping it over the slopes. The tremulous aspen and her adopted sister, the aspen-foliaged birch are rioting in the morning breeze. The torch of the great fire weed is lighting up the waste far and wide, and the steeple bush and the tall Joe-Pye are echoing its tints of rose and lavender.

Most feminine of trees is *Betula populifolia;* straight white-limbed, supple, with pliant spray and light green foliage, fluttering, rippling as with laughter in the lightest breeze, and ready to go into hysterics, as it were, if the wind persists in teazing her. Obedient also to lower her head before the swift summer storm-wind, till every leaf and branch drifts in the track of the gale. How every graceful, yielding motion refutes the myriad-pointed menace of her foliage--every leaf of which--as the late William Hamilton Gibson once pointed out--is cut in the pattern of the deadly Indian arrowhead. At a distance, the black markings on the chalky bark,--the black creases where the trunk springs from the soil, the black triangles wherever a limb springs from the trunk,--at a distance these smutches tone in with the virgin white and on the whole the tree does not belie the nickname of grey birch. Often, however, the young branches, even the *trunks* of the saplings, are a glossy rich dark red-brown and require many moultings before they attain to the white toga of maturity.

Short lived, small statured, a lover of the open--this most gregarious of birches shuns the strange thick-foliaged giants of the deep wood and wins itself a foothold on deserted barrens and fire-swept wastes, in little companies of six and eight. Here for at least a generation she will have few rivals. Only the young fire-cherries, with their slender trunks of burnished bronze, and their blood-red clusters of fruit, dangling to tempt the birds to an involuntary extension of their sway, or the tremulous aspen--slimmest and smallest of the poplars and its kinsman, the sturdier large-toothed aspen.

What pen or brush could portray the delicate fantasies of coloring one often finds on the smooth straight shafts of these two cousin poplars--*tremuloides* and *grandidentata?* In a single thicket you may meet a half dozen different grey-green tones in as many saplings; while in a morning's walk, the gamut runs from a soft old gold to a dull or silvery pale grey bark, that at a little distance closely imitates the white (or grey) birch. It wears however, always this hall-mark of distinction-- a great dark eye with delicately penciled brow, in place of the black *triangular* dead limb scar of the birch.

So both poplars appear under a dozen different bark-disguises --now yellow, now green, often slightly clouded, as though overhung with the thinnest of pale grey gossamer veils-- under apparently only the slightest variations in age and situation. One does note, however, that the greens and yellow are more prominent in the younger trees, or in the older ones, after a heavy shower; while the bark of full grown poplars is often furrowed and darkened at the base quite out of resemblance to the younger smooth-skinned members of the family.

The small, chubby outlined leaf-blade of *Populus tremuloides* and the larger one of *Populus grandidentata*, with its bold-toothed margin, are both alike provided with a long flattened petiole set like a tiny sail for the breeze and ready to turn the whole tree into a thousand whirling green windmills. The same breeze that starts the windmills, sets adrift in May the long haired seeds of the tremulous aspen. On they float, till piloted by chance, they reach the fire-blackened wastes where even the buried seeds and nuts have perished in the heat. Here they drop their worn silken wings and root, and along with them the seed of the great fireweed, borne hither by the wind in its silvery curls. A host of other wood things, great and small, follow these pioneers. The white birches gather gratefully on these wide moors, fire-swept of rivals, and as the year's pass, the green wave of vegetation again sweeps over the mountain sides.

Sans Souci, S. Cor.

GATHERING NUTS.

By Prof. Wm. Whitman Bailey.

To the New Englander there is probably no pleasanter recollection than that of gathering nuts in boyhood. The very thought of those early days attunes the mind to peace and quiet. How well we recall how we used to harness up the old horse, take out all but one seat of the wagon, pack up a hearty luncheon, and set forth for the woods.

These nutting days are also gentian days--suffused with a golden mist; days when the leaves simply drop by their own weight. We observed whole showers of them, yesterday, fluttering through the air like butterflies. One does not need to consult the calender to know when nuts are ripe. An instinct, a something in the air tells him.

Although the horse-chestnut is not one of the edible kinds, it deserves mention for its intrinsic beauty. It is always a delight to see the great green, prickly pods burst open to reveal their mahogany treasures. Where is the joiner or cabinet-maker who can attain or even faintly imitate these beautifully polished and daintily veined globes?. After a half century of experience it still remains a mystery to the writer to know what the small boy does with the immense quantities he amasses. Vainly have we sought information of the youth himself. He stammers and becomes confused when interrogated. The fact remains that no horse chestnut tree is safe from boyish assault and battery.

Of the edible nuts, we suppose that, for a variety of excellencies, the true chestnut is the favorite. The trees are beautiful at all seasons and now are clothed in gold or amber. Children are apt to force the season and gather the nuts too young. The time to seek them in October is after a cool breezy night. Then the spiny burrs open on the trees and the brown beauties come showering down. What a pleasant patter they make! What a delight and fascination there is in poking with a stick among the leaves and finding their retreats! It almost seems as if they were endowed with consciousness and wittingly secluded themselves.

Speaking of the burr, what a consummate work of art it is! Without it is defended by an intricacy of sharp, irritating spines *Notli me tangere* is its watch-word. Within, each of the valves or divisions of the pod is velvet lined as for the reception of some precious gem. The polished surface of the contained nuts must not be marred. There they nestle, three of them usually, close-fitting, with the middle one compressed. Each is tipped with a long spur-like style, for these are more than seeds; they are fruits.

As an instance of contented fatness-- one that would please the elder Squeers-- commend us to the chestnut worm. There he dwells in Nirvana merely eating and sleeping, too obese even to crawl. He is really a most amusing little fellow, a "greasy citizen," indolent and happy; we feel ashamed to disturb his rest.

To us, the black walnut would come next in order of merit to the chestnut, but it is hardly common enough about here to be much reckoned with. Its cousin the butternut, really a true walnut, is much more frequent in New England and extends far north.

The shell-bark hickory is one of the best nuts, and fortunately very abundant. It's flavor is very rich and delicate; it's parent tree among the finest in our forests. Tough, lithe and supple in youth it grows to grand proportions and symmetry. We are apt to find the trees in groves on rocky hillsides. These trees and their near relatives are not, as they are always called in New England, walnuts, but hickories. The noble pecan of the South, best of all American nuts is a member of the same genus *Hickoria* or *Carya* So are the several kinds of pignuts.

The beech nuts, very common with us, the fruit of one of our most superb and shapely trees. is not sought for much as food.

we have so many other nuts that are better. The same is true of our hazels or filberts, but these are attractive from the fantastic beauty of their frilled caskets. We have two kinds, one of which has the involucre prolonged into a beak.

Two accounts of nutting days always come back to our memory. The one is in Miss Warner's "Queechy" and the other in Beecher's "Star-papers." Both are imbued with the true wood spirit.

Providence, R. I.

PASTURE FRIENDS.

By Charles D. Trumbull.

Most of us have ineradicably imprinted on our minds, a book of memory pictures, gathered from numerous trampings in the fields and hills. Some are simple sketches, the sinuous, meandering brook, forcing itself around an obstructing hill; some grand, spreading panaromas; others inimitable patches of color, the May meadow, with buttercups yellow or a splash of flaming meadow-beauty in August. On rainy days we turn the leaves of this book and dream over the gray boulders on the hills, or the cedar trees that stands so prominently forth in winter from their sad colored surroundings. On this particular day our gaze lingers on the poor close-cropped pastures, furrowed and broken where the ancient cornfield once flourished, but now the encampment of an army of hardhack (*Spiraea*). We review each individual friend, from the gnarly twiggy wild apple to this same omnipresent friend hardhack.

No pasture is without this vagabond flower, every pasture, rich or poor, must entertain some of those graceful spires of pink. Around the swampy hollow they muster in a dense compact line, and aided by the scraggly button-bush (*Cephalanthus occidentalis*), they conceal the spot and shield the browsing cattle from the quaggy slough. With compassion for the snow-birds, they retain their bunches of seed and from the snow bound pastures they thrust forth a goodly meal. In mid-summer the weather colored relic of other summer days sway in the breeze like a forsaken last year's bird's nest.

All who have ever read Henry Thoreau's account of the persistent growth and indefatigable development of our gnarly wild apple must experience a feeling of affection for this meek Yankee tree. Thus he describes his search for the "Last Gleaning" of wild fruit. "For I know that they lie concealed, fallen into hollows long since, and covered up by the leaves of the tree itself,--a proper kind of packing. From these lurking places, anywhere within the circumference of the tree, I draw forth the fruit, all wet and glossy, maybe nibbled by rabbits and hollowed out by crickets, and perhaps with a leaf or two cemeted to it, but still with a rich bloom on it, and at last as ripe and well kept, if not better than those in barrels, more crisp and lively than they. If these resources fail to yield anything, I have learned to look between the bases of the suckers which spring thickly from some horizontal limb, for now and then one lodges there, or in the midst of an alder-clump, where they are covered by leaves, safe from cows which may have smelled them out." In his quaint fashion he named our friend of the pasture, *Malus campestrivallis,* "the Apple which grows in Hollows in Pastures." The Truant's apple, (*Cessatoris*) and the Saunterer's apple we easily identify, and *Pedestrium Solatium*, is the friend of our autmun trampings.

On the rain-washed claybank, we usually meet the white hoary mullin (*Verbascum*). Its finely colored blossoms would make a very handsome spike were they all to bloom simultaneously. Rubbed on the cheek, the woolly leaves impart as fine a com--plexion as ever graced a Devonshire maid. The dry naked pole still holds itself aloft until the last heavy snows of winter weight it to earth.

Near where the home-returning herd have worn a rough path, the regal thistle has established itself so sturdily and staunch. In blooming time the brown bees struggle among the purple blossoms, endeavoring to wrest their store of nectar from the kingly grasp. The common *Cnicus lanceolatus,* is named by some botanists as the representative of the Scotch thistle in America, but any of us who have enjoyed an opportunity of seeeing the growing Scotch thistle, are impressed with the beautiful downy appearance of both stem and leaves, much more abundant than in the *Cnicus lanceolatus*. It is a much controverted question respecting the genus in which it rightfully belongs. The ancient coins and paintings reproducing its form were not intended to be botanically exact, and therefore are of no value in pursuit of a decision. A comparative survey of their structure indicates the cotton thistle, (*Onopordon acanthium*) as the Scotch thistle in America and most botanists so credit it now. Though no light of legend nor brightness of song hover near its tasselled blooms, the broad hoary leaves, the stout stem, the formidable spines that repel all advances of friendship so like the touchy Scot, manifest its ancient and royal lineage. One prickly enemy in boyhood was the *Cnicus acaulis,* the low stemless thistle. It lurked low in the grass and unshod feet suffered well for thoughtless treading on the testy leaves.

The aromatic pennyroyal (*Hedeoma pulegioides*) and boneset (*Eupatorium perfoliatum*) reputable and honest members of the domestic meteria medica, are usually tenants of the pastures and roadsides. The aroma of our pennyroyal resembles the true pennyroyal of Europe,*Mentha pulegium,* and is decidedly a faithful alleviator of the disagreeable colds of winter.

Hartford, Conn.

INDIAN TREE AND PLANT MYTHS.

Once you have inspired confidence in your *mallee* and can get him to speak without reserve on the mystic wonders of the vegetable world, you would hear marvellous stories and myths, compared with which the legends and superstitions that still linger in our old-fashioned English villages are absolutely tame. There is a belief in the South of India that any bare-footed person who happens to tread on a "Burdock" datura plant, would immediately become intoxicated and losing his way, wander miles and miles out of his correct path. There is another mystical plant, the identity of which none of my informants could help me to establish, a single leaf of which, if shown to an angry cat, would at once hypnotize the creature and prevent it from moving a single limb. Of flowers, trees and plants which are the favorite abodes of malignant demons, the people of this country believe in a good many. There is the sweet-scented jessamine, for instance. In some parts of the country, the people never plant it in front of the house, for fear a certain wicked imp may take up his abode in the branches and cause injury to the inmates of the house. Jessamine blossome are usually selected by evil spirits who are enamoured of women and wish to make known their sentiments. In such cases, the flowers will be placed beside the woman, particularly on the surface of the water when the woman goes for her morning dip in a tank or a bathing ghat. Jessamine flowers are also popularly supposed to be the favorite food of a certain fastidious species of cobra. There is an amusing belief connected with the Belleric Myrabolam tree, (*Terminalia Bellerica*). It is said that if a splinter from the wood of this tree should get into one's flesh, the quickest and most effective remedy is to go in front of a cotton tree and complain thus :--*Tani* uncle, *Tani* uncle, *Cheru* uncle has deceived me."

An interesting legend regarding the bael tree is that it sprang from the milk of Shree, the goddess of abundance. It is frequently alluded to in ancient Sanskrit poems as an emblem of increase and fertility. Even more interesting is the belief, still full of vitality among the Hindus, that in the end of time all Nature will perish, except one mystic banyan, at the foot of which the deity will be enthroned. Another quaint superstition, brought to this country by the Arabs, is prevalent in some parts, to the effect that rain could be induced to fall during a period of drought by simply setting fire to the twigs of the Madar plant (*Calotropis gigantea*), after tying them to the tails of wild bulls.

It would indeed be surprising were there no superstitions connected with the sacred basil plant (*Ocimum sanctum*) which is in such great demand for Hindu religious rites and ceremonies. The plant is sacred to Vishnu, and is said to have been produced from the hair of a nymph beloved by him in his incarnation as Krishnan. Oaths are made on basil leaves steeped in water. The leaves are held in the hand and swallowed after the oath has been uttered. Indeed, basil is held in the same veneration by the Hindus as vervain (the common English *Verbena*) was by the ancient Romans and Persians, and subsequently the Druids of the forest fanes of old England. Just as vervain was long considered a sure protective against witchcraft and the stings of venomous snakes, so the holy basil is looked upon by the Hindus as a safeguard against evil supernatural influences, the leaves of one variety being employed by native herbalists as an antidote to snake poison.

In connection with the sacred peepul, (*Ficus religiosa*) which by the way, bears such a close resemblance to our English poplar, there is a belief that the god Badavaugny, in the form of a mare, resides in its branches. Vishnu is said to have been born among them and Siddhartan became Buddha while seated under a peepul in a Behar village. This identical tree is still piously believed to be in existence, and a tree growing at Anuradhapura in the Spicy Isle is said to be a branch of that in the Behar village. When the peepul leaves quiver, like those of our own aspen, the trembling is attributed to spirits agitating each leaf. Then there is the neem tree, (*Melia indica*) around which, owing no doubt to its several valuable medicinal uses, a halo of pretty superstitions has clustered. The natives say that longevity is to be obtained by sleeping under the shade of the tree and that the smallpox goddess will go past, without entering, the house from the door of which a bunch of neem leaves is hung.--*Indian Gardening.*

TEA AND COFFEE AS MEDICINE.

The *Globe,* quoting Sidney Smith's remark that "he was glad he was not born before tea," reminds us that there is something of a chock in reflection that the much beloved tea was primarily looked upon as a medicine. Fancy our descendants of a thousand years hence boasting of being "great castor-oil drinkers" or priding themselves on their own particular blend of "rich sirupy rhubarb magnesia!" But despite its extravagant price--sixty shillings a pound it is said to have been given--and the fact that it was considered the sort of thing most appropriately sold by tobacconists, tea made its way, and we find Pope and Young and Cowper and a score of others making their female characters drink "bohea" and eulogizing or satirizing them according to their personal views. Coffee would seem to have had a somewhat similar origin of discovery to that traditionally related about the Bath waters. Of the latter it is told that King Bladud discovered that his ailing swine were cured by bathing in and drinking the waters of a certain spring. What was good for pigs must His Majesty thought be good for men--and the Bath waters retain their reputation to this day. And one day the head of a Dervish brotherhood in Arabia noticed that whenever his goats partook of a particular shrub they became more vigorous and wideawake in their caperings. So he resolved to try whether some infusion of the berries from this same shrub might not wake his "monks" from chronic lethargy that afflicted them. The stimulating and enlivening effects of coffee brought it to the front, and we find that the earliest patrons of the coffee-houses which introduced it were considered wild fellows and "sad dogs." Later on complaints of quite another kind were urged against it. Coffee drinking, it was asserted, would inevitably impair the productiveness of the race, and humanity unable to perpetuate itself would disappear from the face of the earth. But coffee survived this, and equally malicious assaults.--*Indian Gardening.*

NOTE AND COMMENT.

WANTED.—Short notes of interest to the general botanist are always in demand for this department. Our readers are invited to make this the place of publication for their botanical items.

SEEDS OF LOTUS EDIBLE.--The seeds of the lotus (*Nelumbium lotus*), the well known cultivated plant, are eaten as nuts by the Chinese and other natives. When ripe they are peeled and eaten raw.--*Indian Gardening.*

MOSSES USED IN MILLINERY.--In the November *Bryologist,* Mrs. E. G. Britton notes that *Climacium dendroideum,* is also used in millinery, and that *Hylocomium proliferum* is used in the manufacture of moss-roses.

"FAREWELL TO SUMMER."--Mr. Graves' note on the name of last rose of summer, applied to the New England aster (*Aster Nova-angliae*) recalls the fact that this plant is also known by the appropriate and poetic name of "farewell to summer."

RANGE OF THE BIRCH.--The birches are trees of boreal range. Unknown in the Southern Hemisphere and the Tropics, they abound throughout the northern and mountainous sections of North America, Europe and Asia, reaching a more extreme northern range on both continents than any other trees.--*M. L. Fernald in American Journal of Science.*

THE IMPATIENT BLOODROOT.—At least seven months before it is ready to bloom, the flower bud of the blood-root (*Sanguinarea Canadensis*) is formed. One may dig up the plant in early autumn and pulling apart the sheathing bracts, disclose within them the flower, half an inch or more in length, snugly wrapped in the single leaf. The blood-root is not unique in this characteristic, however, for the buds of nearly all the plants composing the early spring flora are formed in autumn; but its flower bud is probably the largest and most easily seen.

FRUIT OF THE POLYGALACEAE.--The milkwort family, to which our flowering wintergreen or fringed polygala (*Polygala pauciflora*) belongs is seldom thought of as producing edible fruits. In fact according to *Indian Gardening*, the only eatable fruit of this order is that of *Xanthophyllum obscurum*, a large, often huge, tree with deep shining green leaves and white flowers. The fruit is as large as a cricket ball or larger, with a thick rind enclosing several seeds wrapped in a sweet white pulp.

THE LARGEST FRUIT IN THE WORLD.--When we are ready to award the prize for the largest fruit borne by any plant it is probable that the humble pumpkin vine will bear off the honors. If asked to instantly name the largest fruit, the pumpkin would scarcely come to mind, but more leisurely reflection points to this as the correct answer. One would naturally look to the Torrid Zone, the home of botanical wonders, for such a prodigy. In this connection the question which is the largest seed? comes up. Is it the cocoanut? Will some reader familiar with the botany of the world tell us?

TEA DRINKING IN BRITAIN.--If they are looked at in a proper light statistics are by no means dull reading and may supply some most interesting facts and subjects for speculation. The returns of the imports into Great Britain of tea and coffee open up some very curious questions. The average Englishman drinks in the course of the year, six times as much tea as the average American or Dutchman and very nearly 100 times as much as the average Frenchman. On the other hand, the Englishman does not drink coffee and only gets throug in a year about a twentieth part of that which the average Dutchman consumes.—*Indian Gardening*.

THE WHITE PINE AND STORMS.--A writer in *Forestry and Irrigation* notes that all the commercially valuable forests of white pine (*Pinus strobus*) are found in the regions of greatest storm frequency in the United States. To be to the white pine's liking a region must have an atmosphere containing a high percentage of moisture, with much cloudiness, frequent small rains and snows uniformly distributed throughout the year and a relatively low temperature. The total annual precipitation in the "white pine belt" is from 30 to 40 inches. The snow falls early and stays late, the average annual fall being about 50 inches on the southern border and 150 inches on the northern.

THE LONGEST FLOWER-STALK.--Probably the longest, if not the largest, peduncle is that of fourcroya (*Furcroea gigantea*). It is frequently over forty feet in length and has a diameter of six to eight inches at the base. Such an organ being exceedingly expensive, the plant takes due precaution that, in case of accidents thereto, there shall be at least one way in which it can retain its immortality in the shape of living counterparts. The plant seems to be arriving at the conclusion that flowers are too uncertain a luxury; it relies much more upon bulbils, and thus the generous proportions of the peduncle become necessary in supporting their enormous weight.--*O. W. Barrett, Mayaguez, Porto Rico.*

FRINGED GENTIAN EXPERIMENTS.--In this issue Mr. Plitt makes an important contribution toward a solution of the puzzle which the irregular occurrence of the fringed gentian (*Gentiana crinita*) forms for botanists. As a point for other experimenters to consider, it is suggested that possibly the plant may sometimes occur as a "winter annual," that is, the seed may germinate in autumn and produce small plants which endure the winter and bloom the following autumn. Certainly those small plants containing but four nodes and bearing one small flower cannot be considered biennials. Perhaps the difference is size and time of blooming is determined by the time of germination in spring or fall.

MYRMECOPHILOUS FERNS.--Several different species of plants have either developed structures designed to attract ants to them for residence or have produced structures that have been taken advantage of by ants for this purpose without design on the part of the plant. A recent report on two species of Malayan ferns of this kind describes the root-stocks as being thick and fleshy with a gallery in the interior running lengthwise and giving off two lateral series of galleries to the branches and leaf bases. These branches are connected with longitudinal chambers in the dorsal half of the rootstock. Ants are said to invariably inhabit these galleries and as the ferns develop no external openings to them, the ants have to make these for themselves in the softer parts of the plants. The ferns are both species of *Polypodium* and grow upon trees.

GENERIC NAMES AND NOMENCLATURE.--Editor Grout of the *Bryologist* has never been charged with being a conservative in matters nomenclatural, but he has a sensible way of looking at certain changes in scientific names that does not include him among the radicals. The following refreshing observations are taken from an article in the November *Bryologist.* "The selection of generic names which will stand every scrutiny is respectfully offered to the logicians of today as a worthy substitute for the discussion of the famous syllogism proving motion impossible or perhaps it would prove as effective in promoting learned argument as the discussion of how many angels can stand on the point of a needle. * * * Many of the rules made by the reformers of nomenclature are wisely chosen, but the avowed purpose of some of them to make the whole matter of botanical nomenclature depend on a set of rules to be mechanically applied with no reference to previous usages, savors of the methods of the middle ages."

REVISION OF THE BIRCHES.--Mr. M. L. Fernald who has been studying a large series of birch specimens, is of the opinion that too many forms of our white birch have been given specific rank. These trees like many other plants of the far north are very closely related to European and Asian species and Mr. Fernald says it is possible to trace by a series of specimens, a direct connection from one to the other. Our paper birch (*Betula papyrifera*) he regards as identical with the white birch (*B. alba*) of Northern Europe and our species should, therefore, be called by the latter name. Under *B. alba* he places the varieties *glutinosa, cordifolia, minor* and *carpathica. Betula pendula* of the old world and its variety *Japonica* are said to represent the two forms recently described from America as *B. alaskana* and *B. kenaica. Betula occidentalis* is considered to be only a form of *B. alba.*

THE ORNITHOLOGIST AND BOTANIST AGAIN.--We were somewhat surprised at the number of orders received for the files of this journal offered in the September number of AMERICAN BOTANIST. There are still twelve sets left, if others desire them. Each set contains ten numbers of eight pages each, and a set will be mailed for ten cents. The journal was the first official organ of the Gray Memorial Botanical Chapter and contains a good proportion of plant lore that is still of interest. Address this office.

THE HELIOTROPE AS A FEVER CURE.--Among our most valued ornamental plants, says *Cosmos,* is the helitrope, not because its beauty, form, and color are specially remarkable, but because it flowers abundantly throughout the year and is particularly fitted for bouquets, its suave odor being specially sweet and agreeable. Now, as if these qualities were not sufficient, a more serious one is attributed to it, namely, ability to cure fever. The ancients, we know, notably Dioscorides recognized this property and in the sixteenth century, if we may believe Bauhin's "History of Plants," its seeds were prescribed to be taken in wine for quartan fever; but in our day of light and progress, who pays any attention to the ancients? So like so many other beneficial plants, it has been cast into oblivion. Now, however, Dr. Pilotoff, of Moscow, has rehabilitated it in a memoir presented to the Russian Academy of Medicine and affirms that the heliotrope can be substituted for quinine in medicine, having all its advantages without any of its inconveniences. He adds that for many years it has been used in Persia, Turkey and parts of Russia as a remedy for fevers with success. "Its mode of preparation is very simple consisting merely in macerating the stems and leaves in brandy." The writer adds that there is now a passion in France for everything Russian, the new medicine evidently opens a rich field for the horticulturist.

EDITORIAL.

With their usual ability to perceive the fitness cf things, the editors of the *Plant World* chose their "souvenir" number as a medium for throwing a large quantity of mud--and very black mud, too--at the AMERICAN BOTANIST and its editor. The editors were evidently in what is known as "a state of mind" when they took up their pens, and all because we do not believe America needs two plant protection societies and have had the hardihood to mention it. To us it seems that if we really mean plant protection, the best way to accomplish it is to help on the work of the original Boston society, but if our object is to brace up the failing circulation of the *Plant World*--why that is another matter. In fact that is the only matter that makes a second society desirable, regardless of how "national" its scope is made by means of honorary officers. The *Plant World* editors are excited and should avoid all stimulating literature for a time, especially the AMERICAN BOTANIST.

The Fern Bulletin celebrated the completion of ten years of uninterrupted publication by making a special number of the October issue, in which are printed articles upon fern study in various parts of the world as well as a complete survey of fern study in America. Although a comparatively youthful journal, it is already the third oldest of American botanical publications, excluding those devoted wholly or in part to horticulture. During its existence it has witnessed the demise of several larger and more pretentious journals for the way of the botanical publication is, at best, rough and beset with many difficulties.

At the beginning the *Fern Bulletin* found it necessary to "make" its own public. At that time people interested in the study of ferns were exceedingly few and to have begun with a magazine like the present one, would have meant failure through lack of support. The first issues were therefore rather small and insignificant, but they rapidly improved with a growing clientele. The number of pages has increased half a dozen times, at least, and at present thirty-two pages are published each issuse. The magazine is now on a safe financial basis and in this respect is probably unique among American publications of its class.

The case of the AMERICAN BOTANIST finds a parallel in that of the *Fern Bulletin* for it, too, has in a measure, had to make a public for itself. Botanists there are in plenty, but botanists who appreciate the study of plants as living things are still as rare as fern students were ten years ago. It is not that the botanists are incapable of taking an interest in such studies, but that they never have had the way opened for them to do so. It is the privilege of this journal to be a pioneer in the new field and to awaken an interest in the habits of the plants about our doors. Interest in collecting plants fails when there are no more rarities within reach; species making must end when the last variant is tagged with a name; possibly wrangles about nomenclature will in time cease; but once one begins to see new beauties in species that are neither new nor rare, he is started in a line of work that will never pall upon him. This is the newer and better botany which we feel sure will ultimately surpass all others and we are building the AMERICAN BOTANIST along lines that conform to it. Just as fast as our following increases, the magazine will be enlarged and every reader who mentions the journal to a friend, helps on the movement.

The much advertised "wooden wedding" number of the *Plant World* appeared without the promised portrait of the senior editor. It is explained that it could not be prepared in time for that issue. Evidently he had been comparing the AMERICAN BOTANIST with his own journal and could not thereafter work up the necessary "pleasant expression."

BOOKS AND WRITERS.

"Postelsia" is not the name of a new breakfast food, however much it may sound like it. It is the title of the year book of the Minnesota Seaside Station and the initial volume is said to contain seven essays mostly relating to algae. The book is printed on Roxburgh laid paper and bound in maroon silk with gold embossed book-plate by Rosendahl and no doubt shows at every point how completely art has become the handmaid of science. The edition is limited to 250 copies at $3.25 each, and as no copies are to be sent for review, the poor editor who, like the country minister, has to depend upon donations for this sort of thing, cannot give it a more extended notice. The scientist will no doubt luxuriate in his Roxburgh edition, but we suggest that when the next volume is published, a few sheets of just common old white paper be fed into the press to make a book or two for the editors.

We note with regret that the publishers of *Meehan's Monthly* have decided to discontinue the magazine at the close of the present volume. For twelve years it has stood as a model of what a journal of popular botany should be and its disappearance will leave a blank that other journals will imperfectly fill. It is to be regretted that a journal so ably edited and so full of real worth should not find sufficient support from the flower loving public to justify its continuance.

"The plants used by the Indians of Mendocino county, California," is the title of a valuable publication recently issued by the United States Department of Agriculture as a contribution from the National Herbarium. These Indians have only been in contact with civilization for about half a century and as a consequence still retain many of their former customs. It is the opinion of the author, Mr. V. K. Chesnut, that several of the wild plants used as food might be introduced into the gardens of civilized men with good results.

Dr. B. L. Robinson's "Flora of the Galapagos Islands" issued as a contribution from the Gray Herbarium of Harvard University under date of Ocober 28, 1902, is a general revision of the peculiar flora of these little known islands, made possible by the collections of the recent Hopkins-Stanford Expedition. There are now 537 flowering plants and ferns known from this region and these belong to no less than 323 genera. A remarkable characteristic of the flora is the number of endemic species that occur. Forty-five per cent, or nearly half the species, are found only in these islands. Thirty-nine out of the seventy-two families of plants represented, contain endemic species, the Compositae, alone containing thirty-nine and the Euphorbiaceae twenty-five. The genus *Scalesia* is found only in these islands and, most singularly several of the islands have each a species of it that is not found on any of the others.

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VAGABONDS AMONG THE FLOWERS.

By Charles D. Turnbull.

At the old cross-roads school, book in hand and stoutly booted feet awkwardly toeing the line at various angles, our grand-parents stammered and struggled through the lines of the "wheat and the weeds," in their old brown covered readers. The verses recounted the experiences of "three youths in city bred," who had rambled for pleasure's sake among the green fields and budding trees of the country. "Of herbs and grain they little knew, what Linaeus wrote or Sinclair grew," and each as he strolled along expatiated upon the beauty and fragrance of his choice of flowers but all condemned the rising blades of green composing the wheat-fields, as unworthy of such bright companionship.

"A Farmer chanced behind the gate
To overhear the youth's debate,
And knowing from ignorance error springs
He strove to teach them better things.
'My lads,' he said, 'now understand
These are the weeds that spoil our land;
But the green blades you trample down
Are wheat, man's food and Nature's crown.' "

These lines illustrate the prevalent and conventional distinction between the flowers and the weeds. Our grandparents probably pondered wonderingly and failed to understand why these flowers so beautiful should be ruthlessly condemned as weeds, these flowers so bright could not be weeds. But in after years they tilled their many acres and entered the eternal fight against the weeds and then hard experience taught them the distinction between Nature's crown "and the flowers that blossom so fair in the sweet summer time."

A convential definition of a weed is any one of those herbaceous plants which are useless and without special beauty or especially which are positively troublesome. Whether a plant be a flower or a weed is often dependant on that pair of eyes through which we view it. Under the second clause of this definition the white daisy of the May meadow, (*chrysanthemum leucanthemum*), the inspiration of poets and admired by all through its virgin beauty, is denounced as whiteweed by the farmers. In a practical sense a weed is not necessarily a flower possessing no esthetic beauty nor does possession of such quality protect it from the brand, but should it prove troublesome to mankind through unusual productive powers and rapidity of growth, it immediately looses caste and becomes a vagabond flower. Our black eyed Susan (*Rudbeckia hirta*) and wild carrot (*Daucus carota*) equal in beauty many pampered garden blossoms, but partaking of the pernicious qualities of weeds, they are forever and eternally at arms with the farmers, and in my state, the wild carrot has long since been outlawed and relentless war is proclaimed against the tribe, which however, continues to spread and increase, and flaunt its banner white defiantly from all the countryside.

The majority of Nature's lovers prefer the first clause of the definition as the most accurate and felicitious, for does not the entirety place all flowers under the possibility of carrying this brand of floral disgrace? True to nature conferred on all, the plant in its congenial soil, location and clime, will flourish and increase. Perhaps in their native soil many exotic weeds are honored and respected flowers, but in the unfortunate day when they secured a stolen entrance along with honest seed into our regions, their downfall was immediate. They proved fruitful and abundantly multiplied, spread over the land and graced the wayside walk or the brown barnyard floors; and that saying, concerning familarity which breedeth contempt is as old as the brown hills themselves and applies also to our weed.

The lesser weeds compose the entire urban flora; the delicate colored species from the fields and hills possess none of the tenacity and vitality of the weed that is so necessary for their urban life. We may liken the field flowers growing in cities to the intensely natural savage, who languishes in pines under civilized restraints; the weeds to that hardy savage with some taste of civilization, that has adapted himself to his conditions and flourishes under amazing restrictions.

They hold a bare, unvegetated spot to an abnormal condition and seem to consider it a point of weedy honor to clothe these naked places on the bosomof mother earth, but there would be fewer complaints were they to confine themselves to the wayside and barren assigned them by the Lord of the earth, and not strive so stoutly to fulfill their office on spots uncovered by men. Even stonewalks in neglected estates are covered from sight by the activity of the knot weed (*Polygonum aviculare*), that embodiment of weedy qualities. The first season, from the edge of the flagstones, it spreads a hardy crop of vegetation. Wandering gusts settle layer upon layer of dust over the plants till they are submerged and life is departed, though not until they have attained their end by producing seed. A later crop springs into life upon this shallow soil and they repeat the operation. This continues the third season and the fourth and in a very short time where was once the walk is the green stretch of weed. Portions of city streets not subject to much traffic must be hoed during the summer months to prevent them acquiring a rural appearance owing to the activity of this vegetable rodent.

Hartford, Conn.

NOTES FROM PORTO RICO.

By O. W. Barrett.

The sensitive plant (*Mimosa pudica*), is one of our worst weeds in pastures here. It's sharp claw-like spines cause almost as much profanity among the field laborers as do the ant nests. It attains a length of six feet or more rambling about in the grass and low bushes.

The Ceylonese *Alocasia macrorhiza*, likewise has a bad reputation here because it preempts the choicest plats of moist, rich soil and carries out the squatter policy most successfully. When left unmolested for a few months it reaches a height of 6 to 8 feet, though, of course, practically stemless. Having found the aristocratic and highly decorative variety, *A. macrorhiza variegata* growing in the midst of a clump of the green "parent" species, it looks like a case of caught-in-the-act sporting; at best I can never be more than civil to *variegata* hereafter.

Speaking of ornamentals, let me record the achievement of a *Crinum amabile,* in our grounds. It had been starving on an unmixed diet of red clay until a few months ago when I began a series of menus which have "gone right to the spot," as it were. The bulb weighs, I judge over 30 pounds and is some 2 feet long; it now has two 4 foot peduncles bearing 29 and 32 flowers respectively; the leaves are 6 to 7 inches wide and about 4 feet long. The perianth tube is 5 inches in length and the petal-like segments are 7 inches; this means the open flower is a foot or more across and its size together with the exquisite coloring, which ranges from pure white to deep purplish red, render it a thing of rare beauty--a sight to remember. Thirty is stated to be the maximum number of flowers per peduncle; two peduncles at once is a very rare event; therefore, I respectfully challenge any reader of the AMERCIAN BOTANIST to beat the above record.

Mayaguez, Porto Rico.

PLANTS IN WINTER.

BY PROF. W. W. BAILEY.

We are apt to think of all plants as lying dormant in winter. As a matter of fact many of them are very much alive. If we cut open a crocus bulb or that of a tulip, we find the fully formed flower-buds within, and most beautiful objects they are. Still, every one knows that the crocuses planted in November will not appear above ground at the earliest till sometime in February.

If they are all ready to develop--as they seem to be, why do they not at once come up? A very natural reply is, that the weather is too cold. The answer is not satisfactory; it is often just as inclement or even more so when they finally do appear. The height of the thermometer then has not been the sole factor. No; our bulbs have been doing good earnest work under ground. Attempts to force the snow-drops by mere increment of heat have failed disastrously. While they develop foliage and an inflorescence after a fashion, they do not form perfect flowers and they perish early with aims unaccomplished. Four months later the normal growth takes place even at a very low temperature.

Many seeds, rootstocks and tubers act similarly. In all such cases the materials contained in the cells are vitally active. The contents of their cells slowly pass through various chemical changes, preparing them for their future function. Neither heat nor moisture will hasten this transformation.

It is right enough then, after all, to speak of a time of dormancy if we do not carry it far enough to involve the idea of death. A seed, bulb, potato-tuber, are inert enough surely, but they are potential with life. A comparison is sometimes made between them and a lucifer match. The latter, too is quiet enough, and may remain so for months or years. When heat or friction is applied, a key has been touched which sets tremendous energy into being. We have violent oxidation with its accompaniments of heat and light. Several springs must be plied to start up the vital engine in a plant. There is oxidation here, also, but accompanied by the subtle, elusive, mysterious force called life.

Of course we all know that certain plants, very many, may have their resting period, their long vacation, shortened without harm. These, like hyacinths, will respond even in November or December to the stimulus of heat and moisture. By mid-January certainly and perhaps earlier, one can force a budding spray of *Forsythia* into a golden splendor of bloom. We even see lilies-of-the-valley and lilacs, neither of them naturally early bloomers, thus compelled to blossom in winter. It stands to reason that it is easier to do this with plants whose time of blooming is early, the Mayflower, hepatica, cherry, willows, alders, birches and the like.

Kerner tells of a curious and instructive experiment he once tried. He drew the shoot of a clematis plant rooted in the open, after it had lost its foliage in the autumn into the interior of a neighboring hothouse. Leafy shoots were developed from the buds of the upper portion thus warmed even in December; while the lower portion of the same plant, situated outside the hot house and surrounded by cold air, was still frozen. This plant, it seems could draw at once upon the constructive materials deposited in its reserve store-house.

There are various parts of a plant which serve as such treasure-vaults. To them, all summer long as to a bank, there is a constant inflow of deposits. Roots or parts of roots, stems or parts of such, scales, etc., may all be employed for storage.

Providence, R. I.

PLANT INTELLIGENCE.

BY M. F. BRADSHAW.

In observing and studying nature the thing which impresses and grows on one is the mind, the intelligence displayed. In some plants more than instinct is apparent and reason of no low order can be seen. Every one knows how most plants secure pollination by bees or other insects. So various are their devices, so beautiful the arrangement of their parts for the desired end, we are lost in wonder more and more as we examine one after another.

How many people look at the nettle with any degree of interest--a thing to be dodged as we reach for a neighboring flower? And who has solved the meaning of those vicious stinging hairs? Until this year, I never gave the plant more than a passing look, but one day, not long ago, something inspired me to take home some of the tall spikes of the creek nettle (*Urtica holoserica*) for study. The flowers look like stringy catkins and are disposed in full clusters in the axils of the leaves.

The two upper clusters were green while those below were white and one naturally supposed the green ones to be immature flowers or buds. But placed under an ordinary lens they proved to be pistillate blossoms, while the white ones were staminate. They are apetalous, that is with calyx and no corolla and they were all closed--little white globes.

A touch with a needle and--pop! they fly open and four stamens are there, the filaments twice as long as the lobes of the calyx and standing curved, cup-like, each with a comparatively large globular anther. At first I thought it surprising that the staminate flowers should hang below the pistillate, for how then could the pollen reach the stigma, till I remembered how some plants desire cross pollination.

Now how wise is this despised nettle! First, it knows that cross fertilizing produces the strongest plants, then to prevent self pollination, the flowers containing the pollen are set below the ones that require it to form the seeds. But the pollen is not to be allowed to waste by falling or being blown away by every wandering wind; it is guarded by the closed calyx till a bee alights there, when up fly the four anthers and must literally clasp the head of the bee. I do not know what in the sober green pistillate flower attracts a visit any more than I know the meaning of the stinging hairs on the stems, but doubtless nectar is there and manages to make its presence known.

Orange, Cal.

SOME ORCHIDS AND FERNS OF CONNECTICUT.

By Angie M. Ryon.

The farm house in which I spend half of each year stands on a somewhat rocky ridge between two wooded swamps. The difference in plant life between these two low lying tracts is a matter of considerable interest to me, for while they are in many respects similar, there is much of individuality in the plant life. This is the more striking because the two tracts are quite near together, and run in nearly the same direction.

In Red Brook swamp I find that tiny orchid *Microstylis ophioglossoides,* adder's mouth--growing in the blackest of mud in thickets of the most impenetrable kind, under tangles of wild grape vine and poison ivy (*Rhus toxicodendron.*) So effectually is this shy little denizen hidden that I must hunt long through these dark tangles ere I find the coveted little green heads ot bloom. Such a quaint little thing! A veritable "symphony in green." Leaf, stem and flower, all the same deep grass green, and often the bulb is quite green. The first time I came upon this little oddity after a good hour of steady fighting against bush and brier, I was quite amazed to think I had found it at all. It was so tiny and so hidden. Growing in its immediate neighborhood I find the inconspicuous greenish flowers of *Habenaria tridentata.*

This is usually more easily found, and is here much more abundant than the adder's mouth. Near these I occasionally find *H. ciliaris,* but the growth is mostly too dense here for this lover of the sunlight, for it needs the bright orb to paint it in glowing color. *H. lacera* blooms among the dark shadows of swamp maple and pepperidge.

For several years I have never failed to find the large blue-green velvety leaves of *Arontium aquaticum*--golden club--in the brook which runs through this swamp; but this year for some unexplainable reason my attractive neighbor was absent, and the brook really seemed to miss it and I felt lonely to see the empty spot where my old friend had been for so long. Why it died I cannot guess. Close by in the dusky aisles under the largest old swamp maples grow fine plants of *Aspidium simulatum.* Such lovely great fronds of tenderest green! I must handle them carefully indeed if I am to get them out of this thicket undamaged. This is to me a beautiful variety, especially when it grows in this spot. A bit lower down the brookside I find quantities of narrow-leaved chain fern (*Woodwardia angustifolia.*) This fern seems to need sunlight in order to send up its dark stemmed heavily fruited fronds. Here too are tall glowing stalks of the cardinal flower (*Lobelia cardinalis*) a dazzling beauty. Just beyond the swamp and in the low woodland adjoining I find the quaint blossoms of that curious orchid *Pogonia verticillata.* I frequently haunt this odd little company as long as the flowers last. Their long dusky purple and green sepals are so odd, the dainty purplish lip with the pretty odd little crest, the whorl of green leaves and the maroon green stalk with its "bloom" all combine to make this little plant seem to me the very embodiment of the time of bursting bud and flower. From the prevalence of the same tints of green, maroon and brown in plant leaf and soil which surround it, as well as its own low stature this little plant is not easy to find.

In the east swamp I find the cardinal flower has thrust up bright wands all along the brook. I also find *Habenaria tridentata* in the sphagnum bogs but the little adder's mouth is entirely absent as is also my favorite *A. simulatum.* Not one plumy frond of it can I find for all my vigilance, neither in the more elevated woodland do I find even one flowering plant of *Pogonia verticillata,* although after long search I found a few low plants of it which ever refuse to flower. But here I find strangers who never frequent other nearby wooded swamps. Here I find that queer freak of the fern world *Aspidium crestatum* x *marginale.* There are but two plants of it in all the great swamp, for I've searched faithfully up and down, hither and yon. These two plants throw up long fronds, many a full yard in length and in such a variety of forms! Looking as if by some misfortune, or some depredation of beetle or worm to have been badly mutilated. But I think nothing has troubled their development but their own "cris-cross" proclivities. I know of no such oddity in flower or fern as this. Close beside it are four beautiful plants of *Aspidium boottii.* This is absent from the adjoining swamp also. On the slightly elevated woods near this tract I find instead of the odd Pogonia a great profusion of *Liparis liliifolia* and occasional plants of *L. Loeselii.* in this swamp the poison sumac (*Rhus venenata*) is entirely absent, while it is very abundant in the Red Brook swamp.

New London, Conn.

THE DWARF BLUE CURLS.

By Wm. A. Terry.

In your note on Canning's paper on the lesser from of *Brunella* in July Botanist, you do not comment on his statement that it does not flower. I have been noticing this plant for several years and can state that here in Bristol, Connecticut, it does flower abundantly. The flowers are darker in color than the common form, and are very small, as are the flower heads also, which grow nearly sessile and frequently in contact with the ground. Last season I noticed in the lawn of the Public Library and in several other lawns on High street, patches several feet in diameter, that were so blue with flowers as to be visible several rods away. On my own lawn a space twenty feet in diameter was covered with flowers. Canning speaks of its vegetative reproductive qualities Last season back of my house, beside the driveway, a plant came up, apparently from seed, of such mammoth proportions that I hesitated about calling it *Brunella,* until late in the season it commenced to flower. It formed a clump two feet in diameter and about two feet high, with numerous flower heads. The flower heads and the individual florets also, were as much larger than the common *Brunella* as that is larger than the lawn variety (*Nana.*) The flowers were also much lighter in color. In a yard near the Congregational church grows a plant of a somewhat related genus which I take to be *Ajuga reptans.* It has a whorl of purplish blue flowers around every node from near the bottom to the top. Beside these is another patch that has pinkish flowers and another more slender variety with white flowers. A lawn on High street a few years ago was covered with the meadow cress (*Cardamine pratensis*). This has a broad flat topped cluster of pinkish white flowers, somewhat like the pepper root, (*Dentaria lanciniata.*)

Bristol, Conn.

SOME DECIDUOUS TROPICAL TREES.

By Mrs. E. C. Anthony.

Having supposed from childhood that tropical trees were evergreen, the changes and dropping of foliage in Nassau were very interesting. The silk-cotton tree (*Ceiba*) always an interesting tree from its great size, the massive buttresses that support its trunk, and huge horizontal limbs, is still more so from its peculiarity of succession of leaf and flower. It has been said that one should have it under examination for three years, in order to see the whole round of leaf, flower and fruit.

There were five magnificent specimens in front of the hotel which were the objects of notice. One in particular was in full leaf the last of November. How long it had been so, I do not know. About Christmas time the leaves, which resemble those of our Horsechestnut, began to fall, and this process continued three or four weeks, when the tree became entirely bare--this state lasting about two weeks. Then gradually and slowly the flower buds began to show. It was a month before the tree was in full bloom, and attracting hosts of insects and many humming birds, with its sweet, heavy odor. The very short time during which the blossoms lasted hardly seemed to compensate for the long process of getting ready. The formation of the pods was equally slow, and it was the last of March before they grew sufficiently to be markedly evident. One of the trees which last year was bare all winter, this year (1902) was in full leaf, and did not change. Another one dropped its leaves from one-half of the tree, and put out blossoms and pods, while the other half remained green. Each tree seemed to be a law unto itself, and apparently not affected by outside circumstances.

A Demerara almond tree which was in full leaf and fruit at Christmas began to change and drop its nuts and finally its leaves in February. The leaves resemble those of the Magnolia, and in changing are many of them as brilliant in color as our brightest maples. It was entirely bare by the first of March, and so continued for perhaps two weeks when it surprised us by putting out tender green foliage, which was half grown by the end of March.

Gouveneur, N. Y.

SOME MUSHROOMS FOUND AT MT. POCONO.

By Mrs. E. M. Dallas.

It would be impossible in this paper to enumerate and still more so to describe all the mushrooms I found this past summer. I have selected a few of the most remarkable, either for looks or for rarity, and will briefly mention them. The country around Mt. Pocono is certainly favorable for the growth of all fungi. After a season's experience I learned two or three facts about it. First that there were few of the genus *Boletus* to be found there, and comparatively few of *Lactarius*. Then I discovered there were a great many of *Marasmius*, and lastly that if there existed but few species of any one Genus, that those few would be what is called in the books, *rare*.

To begin with the genus *Boletus*, there is none more striking in appearance than *B. spectabilis* or the showy Boletus. Prof. Peck describes it in his book as a rare, showy species, which inhabits cold northern swamps. When I saw it, it was growing in marshy ground. There were great numbers of it in various stages of growth. The young plant was covered with a veil and the caps were spotted with reddish scales and had a viscid appearance. Perhaps *Boletus bicolor* which I also found is a handsomer fungus. The two colors from which it obtains its name are red and yellow. The cap is red and the tubes and flesh are bright yellow while the stem is red below and yellow at the top. It is well named and easy to distinguish from others. The tubes and flesh slowly change to blue when wounded. These two species with *Boletus subaureus* were the most striking ones that I found. The pale golden Boletus has the cap, tubes and stem all yellow. The stem is yellow within and without. It somewhat resembles *B. Americanus,* but is stouter, and has smaller tubes of a clearer yellow. *Cantharellus floccasus* called the trumpet chantrelle has been described by Professor Peck in his 52nd report. It is a most distinguished looking mushroom. It grows in the woods, and its rich orange color and the wooly scaly appearance of the cap and its trumpet-like shape render it very striking. The cavity in the centre of the cap extends to the stem. The stem is short and there is a variety called *S. brevipes* in which the stem is shorter still. The specimens I saw were all large, whole plant six and seven inches long and four inches across the top. Prof. Peck says it is a good edible mushroom, and one would nearly furnish a meal. The distinguishing characteristic of the genus *Cantharellus* is the fold-like nature of the gills, but there is no fine dividing line between some genera; one often merges into another, and we may find a species in which the typical characteristic is not clearly defined. Such a case exists in *C. umbonatus* which Stevenson says is a rare species. I sent it to Dr. Herbst for determination. Its color was mouse grey, with shining white gills. The cap which was an inch broad was umbonate and then depressed in the center, the surface silky. The stem was gray and fully three inches long and the gills were decurrent, quite crowded and dichotymous. It grew in moss and looked somewhat like a *Clitocybe.*

We found quite a number of *Clitocybes.* There was the beautiful delicate greenish-blue one, *C. odora* and the white Clitocybe *C. Candida* which Atkinson has described and of which he has given two good pictures. It grew on dead trunks of trees in the darkest and thickest part of the woods, in large groups and clusters, by its pure whiteness lightening up the gloomy space around. The plants were large, measuring eight inches across, but the stems were short and thick, and only three inches in length. The caps were smooth, with their margins turned up and wavy and the gills were adnate-decurrent and crowded. The stems of this species are disproportionally short, considering the width of the cap. The latter is not regular, but is often longer on one side than the other. This mushroom is also said to be good eating. Some of the plants have the stems lateral and so resemble the genus *Pleurotus.* I think they are quite as striking looking when one sees them in the woods, as *Clitocybe illudens. Clitocybe trullaeformis* or the basin-shaped Clitocybe, from the word trullae which signifies a basin or ladle, is quite different looking. The color is grey and the shape funnel-like as the name betokens. It is dry and flocculose, and the flesh white. It is much smaller than the ones I have described. The cap is two inches broad and the stem two inches long and like the cap, of a grey color. The gills are decurrent and distant and shining white. It resembles *C. cyathiformis* in color of cap and stem, but differs in the snow-white flesh. These four Clitocybes are the principle ones I found beside the ubiquitous *C. laccata* which pervades every space. One can not walk along any path, in the woods or along roads without seeing it, and the shapes it assumes are manifold. It is a great trial to the beginner who is constantly thinking that he has discovered a new mushroom.

Craterellus clavatus was a new mushroom to me. It affords another example of the indistinct line of demarcation between genera. The genus *Craterellus,* is allied to *Cantherellus,* which is intermediate between *Agaricus* and *Craterellus.* We are all familiar with *Craterellus cornucopoides.* Its blackish-grey trumpet-shaped cap is found nearly everywhere. If a beginner should find *C. Clavatus* he would hardly recognize it as a *Craterellus,* so different is its shape. The name *clavatus* shows that it is club-shaped, and it somewhat resembles the family *Clavaria.* It was irregularly club-shaped, of a pinkish yellowish hue, three inches long and one-half inch wide. The cap was rough and fleshy and it became narrower as it joined the solid flexous stem. The flesh was thick and white. Atkinson gives a fine picture and description of a mushroom that I found for the first time this summer.

It is *Hypholoma rugocephalum*. The regose markings on the cap (like the rivers on a map) only raised and the reddish brown color, shining like varnish, mark it distinctly. I saw it often during the season.

I found at least four new species of *Inocybe*. *I. rimosa* so called from the margin splitting up, *I. asterospora* from the star-like shape of the spores, *I. eutheloides* (which I suppose is almost the same as *I. euthcles*, so called from its prominent umbo, *I. geophylla* of which there is a good picture given in Stevenson, page 252. This latter is of a white or greyish color and the cap only measures half an inch across. It is named *geophylla* from the earthy color of the gills which are at first grey and then earth color. It is an interesting little mushroom, with its conical cap and prominent umbo or rather papilla. We became quite familiar with it.

Marasmius is the genus of which we found the greatest number of new species. There were five or more new to me. One of these *M. resinosa* seemed to puzzle every one. I finally sent it to Prof. Peck and he wrote to me about it. He had at first named it *M. decurrens*, but finding that name appropriated, called it *M. resinosa*. Mr. Lloyd forwarded the specimens I sent him to Prof. Beardslee, as the latter is writing upon the genus *Marasmius* and I believe is glad to get specimens and reports of any new species. I sent over two hundred specimens to Mr. J. B. Ellis, as he wished to use them for Fungi Columbiani as well as three hundred specimens of earth-tongues, *Geoglossum glabrum* for the same work. The *Marasmius* grew on dead leaves in the woods. It was pure waxy white, unlike so many that have the stems black or dark color. The gills, too, were truly decurrent. The young ones were campanulate shaped but the caps expanded as they grew and a little umbo was formed, distinctly marked and giving it the appearance of a derby hat with a narrow brim and round crown. It revived beautifully when placed in water. The fact that *Marasmius* will revive when moistened, makes it easy to keep the plants, and it is the best genus we have, since the specimens can be kept without drying up beyond recognition.

I must not admit to mention the prettiest small mushroom next to *Marasmius resinosa* that I have ever seen. It is called *Pholiota mycenoides*. Stevenson describes it on page 237. I found it in a clay bank, near a spring. The soil was soaking wet from recent rains, and these tiny mushrooms (there were only a few to be seen) were glistening with moisture. The caps measured about a quarter of an inch to one-half inch across, but were remarkable for the large white ring like a collar, that was around the top of the stem, concealing the gills. The color of the bell-shaped and striate caps was a bright reddish-brown, but some were paler in color. The stems were only one inch long, smooth and a little paler than the caps. The name denotes their resemblance to*Mycena*, but the genus *Mycena* has no ring. The color of the ring was white and considering the small size of the mushroom, it was large and conspicuous. It reminded one of Queen Elizabeth's ruff. Stevenson calls it a remarkable species found in damp dells, which exactly describes its habitat. I do not believe that many of us have found such a tiny *Pholiota*.

The next mushroom on my list is *Coprinus tomentosus*. The specimens we found were beautiful. The caps were covered with a white woolly substance, which came away easily when handled, showing the pale mouse grey color beneath. The plants were small and grew on manure in a grassy place. The caps were conical, about one and one-half inches high and the gills were brown.

Our collection of mushrooms was not confined to Agarics. We found a species of *Xylaria*, *X. corniformis*, which resembled a roughened black club in shape. It belonged to the class of Ascomycetes or spore-sac fungi. We have often met with *Xylaria polymorpha*, but *X. corniformis* seems to be less abundant. There is another of the Ascomycetes that we saw several times, but later in the season. It is named *Cordyceps militaris*. It looks like a *Clavaria*, but one can see with the help of a hand lens, the orange-colored perethecia imbedded in the club shaped head.

Cordyceps is a genus that becomes parasitic either on insects or on some subterranean fungi. It often grows on moths, buried beneath dead leaves, the club rising above the surface. It may sometimes be seen in conidial stage and looks like a small white plume. Not far from the grassy place where I found the little

Coprinus, stretched a shady road, passing through dense woods. One side of it was bordered by a high clay bank, on the other the ground descended steeply to a little brook, and on both sides grew a tangled mass of rhododendrons. Through the month of July the great laurels reigned supreme and little could be seen but the gorgeous flowers, but in August the clay bank turned out to be a treasure house of fungi. The pretty Peziza, *Lachnea macropus,* grew in numbers. Underwood has a drawing of it (Plate No. IV. page 230) in his books on "Moulds, Mildews and Mushrooms;" but it gives no adequate idea of the grace and beauty of the plant. It is shaped like a delicate goblet of a grey color. Some of them were nearly three inches high and the caps measured one and one-half inches in width. Prof. Atkinson mentions two species of *Sarcoscpyha.* This is also a peziza, a sub-genus of *Lachnea.* I did not find at Pocono the species he describes, but another one named *Sarcoscypha occidentalis,* which I sent to Mr. Ellis for identification. It grew in the center of a clump of moss and could not have measured more than a line in breadth. It had a slender stipe, which was white and smooth, in strong contrast to the bright scarlet cup. It must be a much smaller species than those that Atkinson mentioned and it grew later in the season.

I found one species of *Guepinia.* It resembled tiny pinkish clubs, peeping through the chinks of a piece of dead wood. This genus belongs to the Tremellineae and the plants are gelatinous in their nature.

The mushrooms I have described, form but a small part of the many I found at Mt. Pocono last summer. There is no room in this paper even to mention by name the various species of *Russula, Lactarius, Hygrophorus, Mycena* and *Collybia,* or any of the more familiar Agarics. I leave to the last our most interesting discovery. We saw a mushroom growing on an old dead log, very different in appearance from all we had hitherto seen. The color was grey, the shape was disc-like, the stem short and slender and the hymenium almost smooth. It was plainly not an Agaric. I sent it to Mr. J. B. Ellis and he pronounced it a new species of *Ciboria,* a subgenus of Peziza. The plants grew on dead wood. Mr. Ellis asked me to procure some more specimens which I did with difficulty, as they were extremely rare. These confirmed his opinion as to its being a new species and he will publish it under the name of *Ciboria Dallasina* E. and E.

Philadelphia, Pa.

NOTE AND COMMENT.

THE DWARF BLUE CURLS.—In connection with Mr. Terry's valuable article in this issue, the editor would note that the dwarf blue curls (*Prunella vulgaris nana*) in his grounds appears to bloom as freely as the large plants of roadsides and ditches. With us it roots at nearly every joint and is thus able to spread with great rapidity.

ONIONS AS A RIVAL TO THE ANEROID.--In some country households there are to be seen at the present time twelve large onions placed in a row, with a pinch of salt on the top of each. What mission have these odoriferous roots to perform? They are there, the *Agricultural World* explains, as weather prophets. The onions were set in position on Christmas Day. They will be kept on guard until Twelfth Night. Then the believer in their prophetic office will examine them with scrupulous care. On some onions the salt will have melted; on others it will have remained dry. Each onion represents a month. A rainy month is indicated when the salt has melted, and a dry month when it has kept intact.

A NEW LOCAL BOTANICAL CLUB.—The constitution of the American Botanical club provides that when there are five members in one locality these may form a local branch which is to be given a number and the name of some flower, the latter chosen by the branch itself. Acting upon this, Mr. H. S. Clark has secured for Connecticut the honor of possessing the first branch by establishing at Hartford, Erodium Branch No. 1. Mr. Clark has been elected president and Miss K. A. Bartholomew, secretary. The meetings will be held on the first Monday evening in each month. By forming a local club such as this students of plants can gain many new ideas that might not come to them working alone and the example of Erodium Branch is recommended to others. The branch receives its name from the fact that the president recently found the first *Erodium moschatum* reported from Connecticut.

EDITORIAL.

The present year seems to have been a hard one for botanical publications. In addition to *Meehan's Monthly,* the *Junior Naturalist* and *California Floriculturist* have given up the ghost. While the subjects to which these journals are devoted make them in a certain sense rivals of THE AMERICAN BOTANIST we take no pleasure in the passing of the least of them, for each suspension is but another proof that in botanical fields the battles are sharp and the rewards few. A successful botanical publication is likely, for some time to come, to be catalogued with the rarest of rare species.

Although there are still in existence a dozen or more publications devoted to botany in its best sense, the latest reports of the newspaper directories do not credit a single one of them with a circulation of as many as a thousand copies. This is truly a poor showing for publications devoted to a science that is taught in nearly every High School in the land. One subscriber for every hundred thousand of population! Is it at all surprising that an editor after doing his best for years to advance his chosen science should finally become disgusted at the small interest displayed and draw out of the race? Another thing that adds to the botanical editor's chagrin is the fact that some of the horticultural and floricultural publications have most astonishing circulations. One magazine, in particular, issues more than three hundred and fifty thousand copies each month. If botanical journals were half as well supported the science would advance much faster than it does at present.

The reader may ask how he is concerned in all this. At first glance, the matter may seem to be one in which editors and publishers alone are interested; but it can readily be shown that it is of vital importance to every person interested in botany. A botanical journal that is not properly supported, will sooner or later be obliged to suspend, leaving the field to less worthy publications if it is occupied at all. No one doubts that the botanical publication is of great value to the science; it gives in a single year more specialized information than can be obtained elsewhere for many times its price. Therefore, it behooves every botanist and botanizer to stand by any that are worthy, supporting them not only by subscribing, but by speaking of them to others, by contributing to their pages and in various other ways helping toward their advancement. An attractive botanical publication is as much a credit to its subscribers and contributors as it is to the one who edits it or the country in which it is published.

Although the past has held very little of encouragement for the botanical publication the prospects for the furture are much better. The large number of nature books that have been issued in the past decade, are slowly but surely increasing the number of those who take an intelligent interest in plant and animal life. Some of these books have sold from twenty-five thousand to one hundred thousand copies each--figures which the average novel fails to reach in spite of the phenomenal sales of a few of the leaders. In the light of these facts it is not too much to expect that the next few years will develop botanical magazines of from thirty two to sixty-four pages, with subscribers enough to make their publication worth while. But such magazines will not develop unless properly supported.

The gentle art of scientific criticism has received a new interpretation from a recent reviewer of a paper on the birches by Mr. M. L. Fernald. The critic, finding nothing wrong with the facts, still unwilling to agree with the author, pitches into his diction. Criticism of this kind, however, comes with bad grace from a critic who is author of that famous phrase "birds and animals." If birds are not animals, what are they?

Referring to the note in a recent number of this magazine regarding the color of the berries of the false Solomon's seal or wild spikenard (*Smilicina racemosa*) a correspondent writes: "For three successive late autumns I have made note of the fact that these berries lose their spots and become clear red when fully ripe and yet I did not dare say so." If plant-lovers generally knew how much is guessed at in the making of even our best manuals, they would doubtless study the plants in the field with greater diligence. It is no secret that the text books are founded on dried specimens. Many of our most distinguished scientists rarely go afield for study. Anyone who has noted the difference between the dead and flattened mummy of a plant and its living counterpart can readily realize that the closet student may become so familiar with the dried specimens as to scarcely recognize recently gathered material. It is told of a prominent New England botanist that when he found it difficult to identify a living plant, he used to say, "Well, let's dry it and then see how it looks." And fern students assert that a certain prominent authority at Kew refused to name ferns submitted to him unless they were first dried! Students of plants, therefore, should not too easily become convinced that their observations are wrong. Possibly the book is at fault. And in any case when book and student do not agree, it is well to make a note of the difference and get the opinion of others about it.

Dr. Adolf Wagner of Innsbruck, Austria, announces that beginning with January, 1903, he will issue a bi-weekly publication devoted to abstracts of original botanical articles, such abstracts to be furnished by the authors. No charge is to be made for publishing the abstracts. The first year's subscription has been fixed at 28 kroners.

With the increase in the interest in natural history has come the desire to grow and study plants from other localities. Among those who are catering to this want, a prominent place must be given to Mrs. S. B. Walker of Sedalia, Colorado and Harlan P. Kelsey, Kawana, N. C. Mrs. Walker's specialty is seed of Colorado wild flowers. The editor has had considerable pleasure the past summer in watching the development of plants from some of this seed. Mr. Kelsey's specialty is hardy native plants and the catalogue that describes them is so finely illustrated, that it is worth preserving with other botanical literature. His nurseries at Kawana are in charge of a member of the American Botanical club. Mrs. Walker also issues a catalogue. A copy of either catalogue may be had for the asking.

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CONCERNING THE APPLE.

By Chas. D. Turnball.

It seems that when a writer on nature desires to attest and confirm his title and demonstrate his ability to interpret nature's moods and signs he naturally employs the apple in his effort. Thoreau's essay on the apple has never been equalled for fullness and understanding, John Burroughs has also written entertainingly on the subject, and every writer appears to consider it an appropriate subject and a proper one with which to further his claim to consideration. The reason for this is plain. The apple is so thoroughly individual in the wood; the ash superficially resembles the maple, the chestnut resembles the oak,--in truth all have many points of similiarity; but which could be confounded with the apple, even by one unacquainted with out-of-doors lore? On the tree-clad mountain-side it attracts our gaze as surely as the majesty of the oak or the stateliness of the chestnut. Since the course of empire began its journey towards the setting sun, the apple tree, like the cow and horse, has followed in its wake, and in the course of ages has acquired an appearance of domestication. This way explains how, though ungainly and illfavored, in comparison with the beauty of the elm or maple, it is admired by all with whom out-of-door nature finds favor.

It is one of the few trees of temperate latitudes that are practially never found in an absolutely wild state. Those hardy trees on the hills are not wild. From cores carelessly tossed here and there by America's first farmers and with the aid of the cows and birds it left the bounds of civilization and began life in the wilds. But it will be noted that only the hardy kinds, the Russian varities, have ever evinced a desire to run wild. Our summer apples, the Astrachan and Golden Sweet, from southern Asia, are quite content to grow under man's protection.

In the early times of towns in the old states every goodman surrounded his gabelled domicile with an apple orchard and in the cool of evening he strolled through the dark lanes of trees. But the increase of the town in after years, cut his orchard, like Wolfert Webber's cabbage patch, into snug building lots, and though many trees were felled to make way for streets and houses numbers remained, and to this day the goodman's orchard may be seen in the tottering, age-blasted trees in the yards of old houses in the ancient parts of the city, some bearing fruit, of varieties that long since disappeared, though without doubt we might find some of their venerable brothers in sleepy, mouldering English hamlets.

The old age of the wild apple is pathetic. Often we see their dried, lichen-covered skeletons in the meadows and on the hills, and in the forest clearing is a poor-looking, stagheaded tree that vainly strives to cover its blasted limbs. For these many years they have responded to vernal warmth with coats of white and pink; the glory of June days and the breath of brown October contributed to the many yields of unmarked fruit, unmarked, but by the squirrel or browsing cow, or such as myself, who tramp the hills. The robin and blue-bird nested in the crooked limbs, and while the warm spring sun shone above, they taught their callow young. But wintry storms of rain and biting wind have corrupted and torn the aged limbs and a few seasons will lay them on the sward.

Hartford, Conn.

FRINGED GENTIAN.

By Wm. A. Terry.

I was pleased to see the account of experiments with the fringed gentian by Mr. Chas. C. Plitt in the October Botanist. I think there is no doubt that the plant is a biennial in this section. My edition of Gray says: "Annual or biennial," and all my observations and experiments have convinced me that here it is biennial. It is growing more rare every year, and I fear that all efforts to prevent its extermination will fail. It is difficult to propagate. Some twenty or more years ago a well known Scotch gardener of Hartford offered a prize for plants artificially grown from seed.

It grows best in wet meadows and frequently in bushy swamps and swampy pastures and often in moist places by the roadside. In the meadows it is almost certain to be cut down with the late grasses, before maturing its seed, by the roadside it is equally certain to be gathered in flower. But, beside these dangers, it has another enemy more destructive than all others. Several years ago I found nearly a hundred of these plants in flower by the side of an unfrequented road. I gathered all those that were conspicuous, hoping that the others would escape observation. Later I visited them again, and found the seedpods matured and gathered some hundreds of them. On examination not one in twenty of these contained any seed. The others were inhabited by a small, light colored larva that had devoured most of the seed, and was rapidly consuming the rest. In December of the same year, I was exploring a woodland some five miles away from the place where these seeds were gathered, and found a number of dried plants still holding their seedpods upright. On examination these were found to contain from one to three of similar larva in each pod, much larger and darker in color than those found in the fall. They had consumed every seed and were evidently hibernating for the winter.

The seed we had collected were carefully planted. Some immediately after gathering, and some in the following spring. They were planted in the window garden, in the green house, in the flower garden and in the fields. Some that my wife planted in the window garden came up, and she had two or three dozen plants. These were potted up as they became large enough and some of them were planted out in the spring. They were slender and slowgrowing plants, very sensitive to injuries, and all of them died at various periods before reaching maturity. None of the other seeds planted at various times and in various places ever came up.

Another of our wild flowers the mountain fringe (*Adlumia fungosa*) is generally called a biennial. Three years ago I took a young plant from the mountain, and set it out back of my woodhouse; it grew luxuriantly and covered the roof with vines loaded with flowers, which ripened an abundance of its black, shiny seeds The next year to my surprise none of them came up, but this year they sprouted in quantities, making numerous stout, healthy plants, which are now in condition to make flowering plants next season, thus taking three years to flower from seed. Another wild flower in danger of extinction here is the painted cup (*Castilleia coccinea*). It used to grow in wet meadows in such abundance that the school children called it "headache plant," claiming that it gave them the headache to go through it. I well remember as a child that a bunch of it held before the face was so dazzling to the eyes as to blur the outlines. I have sometimes seen patches of it in which the floral bracts were tipped with bright yellow instead of scarlet. For several years this plant has been very scarce here.

Another fact I have observed, I would like explained. If the flowers of some perennials are picked, the plants disappear. I have known this to happen with the orchid, *Colopogon pulchellus* and some others. Several years ago a field half a mile from my house was full of flowers of *Chamaelirium luteum*. Some ladies picked them all to decorate a church, and since that time not a flower of this plant has ever been found in that field or its neighborhood, as far as I can discover.

Bristol, Conn.

THE PHYSICIAN'S NEED OF BOTANY.

By Prof. W. W. Bailey.

It will be at once conceded that it strengthens any operator, artist, or artisan to have an intimate acquaintance with the tools of his profession and it would seem that a certain knowledge of botany while not perhaps essential, would be very desirable to the physician. The history of the two sciences is coetaneous.

Yet many physicians are confessedly ignorant of botany, and will assure you, from the fact that they have succeeded without it, that it has no practical value to the doctor. I confess that this argument is hard to meet, nor would I attempt to face it if it were not for the fact that just as learned physicians contend for it and some of the Medical schools expect it.

That many physicians have considered botany important, is proved by the numberless recruits we have had from their ranks. Some of the greatest lights of botanical science have been physicians. We have but to look to our own country to find the names of Torrey, Gray, Engelmann and Goodale. All these men started as doctors and, for one cause or another, drifted into the sister science. Army and Navy surgeons not a few, as a relief perhaps to the tedium of garrison or ship duty, have taken to botany or kindred science. Note such names of Elliott Coues and Valery Havard.

Granted that botany is of use to the physician, on what grounds do we base the claim? One strong reason for at least a rudimentary knowledge, is that one can here best study the organic cell in its simpler and afterwards in its more complex combination. Essential microscopic technique is at the same time acquired. Then again, all about us, in air and water, in our food, *everywhere* in fact, prevail microscopic organisms, many of them potent and insidious causes of disease. I have only to point out that bacteria are plants, to show how important it is to know something of their structure and life history.

I sometimes fancy that when a physician remarks that botany is of no use, he is thinking of the old style botany, mere analysis, so-called. If our study led only to the dry facts of systematic arrangement, non-vitalized by the story of the plant's life and relations, I should vote with him in regard to the waste of time spent in the pursuit. Nowadays we hope to have reformed this altogether.

The student learns to recognize certain medicinal plants, their affinities, properties and derivatives. He learns also from mental deduction to expect certain qualities for good or evil in definite groups or orders of plants, and knowing these tendencies or fixed characters, ever looks for them when these plants occur.

Thus in *Papaveraceal* he expects norcotics akin to opium; in *Solanaceae* such alkaloids as atropine or nicotine, daturine, or hyoscyamine; in *Umbelliferae* acute poisons, like conium, aethusa and cicuta, drugs like assafoetida; in *Euphorbiaceae* irritants or purgatives, like croton or castor oil.

On the other hand he is assured that *Malvaceae* will yield him only harmless, soothing mucilages and the *Labiatae,* perfumes essential oils, balms and stimulants. He can thus, in a strange country, apart from societies, libraries and collections, build up a local pharmacopeia, making substitutes of indigenous plants for those known at home.

By careful botanical study, he not only learns to systematize and generalize--useful pursuits both, when infused with life--but also to detect adulterations and frauds, to hate quackery and pseudo-science, and to foster only what is experimentally proved to be useful, or by logical inference presumed to be so. Apart from immediate and tangible results, the incidental training in observation, comparison, diagnosis, must inevitably redound to one's mental advantage.

The study of medicine is almost coeval with the origin of the human race. With man came woe and the desire to relieve it. Says Cabanis: "As man cannot exclude himself entirely from the constant agency of many external causes; and as he carries with him several others which are destined to act at particular periods of life, or which may at any time exert their influence; we may with safety affirm that the first trials of particular remedies bear almost as ancient a date as the existence of man himself. Among the most rude and uncultured tribes,as those of New Holland and New Zealand, of Lapland and Greenland, of North America and tne interior of Africa, we find traces of the practice of medicine and surgery."

HOW INDIA RUBBER IS OBTAINED.

The true "Para," India rubber (*Hevia*) is to be found growing naturally within the immense forest-covered area of the valley of the Amazon and in the tributary rivers, including the head streams of the Orinoco. I found it abundant high up on the Orinoco, above the junction of the Guaviare (the latter stream by right indeed, should be styled the head stream of the Orinoco). It is plentiful on the banks of the Cassiquiare--that curious bifurcation by which the Orinoco gives a stream to the Rio Negro. and so converts Guayana into an immense island. I also found it growing in the interior betwixt the Tapajos and the Xingu. The rivers from which the largest supply is drawn now by traders are the Purus and the Maderia. In its native forests it grows dispersed among the other forest trees, two or three trees rarely being found in juxtaposition. In appearance the *Hevia* is a handsome tree, with straight cylindrical trunk--differing wholly from the Ule—the India rubber tree (*Castilloa*) seen in Moskito and Nicaragua to South Mexico. The wood is soft and perishable. The bark as in the great majority of tropical trees, is not very thick, and is of a gray color on the surface, but when scraped, approaches the appearance and color of a light bay horse's coat. This cleaning has to be done, as in moister regions the bark is thickly coated with growths of moss, ferns and orchids. The seeds grow, three together, in a sort of hard pod. This pod, becoming heated by the sun bursts when it is ripe with a sharp popping sound and scatters the seed for a considerable distance around the tree. The seed is exceedingly oily, and the oil extracted therefrom, closely resembling linseed oil, is a valuable product. The range of temperature in the *Hevia* forest is between 70 deg., and 90 deg., throughout the year. Rainfall varies considerably in different districts where *Hevia* is found, some districts being nicely divided into wet and dry seasons, each of about six months' duration, while in others it rains more or less the year round. In such districts it is more difficult to collect the *caoutchouc* profitably, as if the stem of the tree is very wet when it is worked, the *latex*, or rubber-milk, spreads over the surface, of the bark, and is in large part lost. From what has been said it may be seen that the main part of the India rubber must be collected during the dry season, although "siringaros." who live near "ciringals," or rubber walks, improve their opportunity by tapping their trees whenever fine days occur during the rainy season. But the trees are doubtless better for a half yearly rest.

When the native hunter has discovered for himself a district of the forest in which "siringa" trees are sufficiently numerous and near together he first connects them together by cutting a "picado" or path, with his bush knife. Having thus discovered their relative bearing, he next straightens and clears out his paths, endeavoring at the same time to take in as many trees as possible on each path, and to make all the paths converge to a certain spot, where he puts up his "barrica"or curing station. This done, and having collected a supply of the old nuts of the *inaja* (*Maximili-*

ana regia) or similar oily palm nuts, he is ready to commence operations on the first fine day. There is some diversity in the manner of taking the rubber *latex* in the Amazon valley. In some districts they prepare long strips from the inner pith of the footstalk of the leaf of the *inaja* or of the *bacaba* palm. These are tacked obliquely round the stem of the trees, with sharpened pieces split out of hard covering of the same leaf stalks. These strips, being smeared on the inside with wet clay, form a channel for collecting and conducting the *latex* milk into the cup placed to receive it. In the other method, which I consider the better, the cups are put on in a ring round the trunk, usually a span apart. Three cuts about 1 1-2 ins. long are made in the bark with a small axe. In this way the number of cups is proportioned to the size of the tree. Tin cups are used. They are made slightly concave on one side in order to fit the convexity of the tree trunks. They are attached to the tree by the use of a piece of the ball of kneaded clay, which each collector carries in his bag. The tapping always begins as soon as there is light enough in the forest path to see by, One man is usually apportioned to each path, containing, say, 100 trees. When he has tapped his trees, he sits down at the end of the path for half an hour or so, but as soon as he sees that the tree last tapped has ceased to drip,the milk, he starts at a trot on the back track, detaching and emptying the cups into his calabash as quickly as possible. Speed throughout is a great object, as the milk *latex* speedily coagulates, and then can only be sold on the market for an inferior price, as *serwambi*, as compared to that obtained for that which has been smoke-cured. When the men arrive at the central hut from their different converging paths they each empty their quantum of the *latex* taken for the morning's work into one of the large Indian native earthenware pans, usually used as a receptacle. Care is taken to squeeze out with the hands all of the already coagulated curd-like masses. These are thrown on one side to be made up into balls. Earthen pots in form of miniature kilns are placed over small fires, and the "siringero" sits down to the really tedious part of his business. He drops a handful or so of the oily palm nuts down the narrow neck of the kiln, and forthwith arises a dense smoke. Taking a wooden mould--

like an ace of spades in form--and holding it over the pan, he pours some of the *latex* over it in a thin film keeping it turned, so that it shall not run off before he succeeds in setting it to an even surface, which it soon does as it is passed backward and forward through the column of smoke. This is continued, one coating after another, until he has finished the day's supply of rubber-milk. He then sticks his mould up in the thatch of the roof of the shed for the repetition of the process next day, and until he finds the thickness of the *biscuit* makes the mould unwieldy to handle, when it is cut down one side, slipped off, and stored.--*Indian Gardening.*

A NEW WAY TO OBTAIN SPORELINGS.

The gardener of a hotel in Florida noticed numerous little plants of Maiden-hair fern (*Adiantum capillus- veneris*) clinging to the side of a large pot containing an old plant. On examination he saw that the spores had fallen and germinated in the congenial warm, moist situation. He was fond of experimenting with ferns and prepared a large pan in which he put several bricks of the common building sort, and filled the pan about half full of water, coming about half way up the bricks. When they were thoroughly saturated he shook the spores of certain ferns upon them and awaited results. In this way he raised many ferns, though having sometimes to wait months for their full development. On inquiry I found that the most interesting feature of the plan to him was the variation he found in the young plants from their progenitors.--*Mrs. E. C. Anthony in Fern Bulletin.*

CLIMATE AND VEGETATION.

Physical geographies have heretofore paid some attention to the question of plant and life zones, but it has been usually very superficial, consisting of an elementary discussion of the climatic conditions associated with certain well known and easily distinguished plants. Thus Houghton says: "Plants require for their growth certain conditions of light, heat and moisture, and since the requisite amount of each of these varies with different species of plants, we find in every climatic zone a characteristic flora. * * * Moisture and heat are the prime essentials of vegetation, and it is on their distribution that the distribution of vegetation is principally dependent. The influence of heat and moisture is noticed as we pass from the equator to the poles, or from the base of a tropical mountain to its summit, thus arises a horizontal and a vertical distribution of vegetation."

The horizontal zones of vegetation have heretofore been designated the tropical, subtropical, warm temperate, cold temperate, subarctic, and arctic, each with its distinguishing climate and vegetation, although overlapping each other somewhat. The Biological Survey, however, has given a different division, calling the three life zones of North America the tropical, austral, and boreal, subdividing these into the tropical, lower austral, upper austral, transition, Canadian, Hudsonian, and arctic--seven in all. The tropical is indicated by the region in the extreme southland, including the southern parts of Florida, Central America, the lowlands of Mexico, and the lower Gulf region; the austral covers the whole of the United States and Mexico, except along the extreme north and south, while the boreal covers the entire northern part of the continent to the polar regions, and also a few peaks of the higher mountain systems within the United States.

Subdivided and considered for temperature, the survey finds that the tropical zone is confined within that area which has a total quantity of heat approximating at least 26,000 degrees F. This is obtained by considering 43 degrees as the beginning of plant activity. With 43 degrees as a beginning, the effective temperature or degrees of heat (daily mean normal shade temperatures) in excess of this number were added together for the several stations considered in the different zones, beginning when the normal means in spring exceeded 43 degrees and continuing until it fell to or below that point in the fall. With this as a basis the tropical was found to lie within lines which were bounded by an annual quantity of at least 26,000 degrees. The lower austral was confined to a region which required a total quantity of at least 18,000 degrees F. The upper austral to a region and to plant species which required at least 11,500 degrees F. The plants of this zone apparently can not endure daily a summer temperature during six consecutive weeks of 79.8 degrees. The transition was confined to a region which required at least 10,000 degrees, the plants of which were apparently unable to withstand six consecutive weeks of daily summer temperature averaging 71.6 degrees, and the Canadian, Hudsonian, and arctic extending thence northward into the polar region, their southern limits being marked by the isotherms for the six consecutive hottest weeks of 64.4 degrees, 57.2 degrees and 50 degrees, respectively. The conclusion of the survey in regard to the distribution of plants and animals is as follows: "The northward distribution of terrestial animals and plants is governed by the sum of the positive temperatures for the entire season of growth and reproduction, and the southward distribution is governed by the mean temperature of a brief period during the hottest part of the year."

Vegetation throughout the greater part of the United States lies within the temperate (or austral) zone, and is dormant during several months of the year. It is within this region, however, that our largest staple food crops are produced. Germination and growth are wholly dependent upon the temperature in excess or deficiency of 43 degrees. Adamson says that "the development of buds is determined by the sum of the daily temperatures counted from the beginning of the year." But it is likely that a more accurate expression would be the sum of the daily temperatures from the cessation of winter.

The adaptability of plants to climate is so great that it is questionable if the heat units obtained for one latitude would be those required in a more northerly or southerly latitude. Take wheat, for instance; it can be grown successfully within the semitropical zone and thence northward beyond the cold temperate zone, a range of probably 20 to 25 degrees of latitude, and in the northern limit the rate of growth is the more rapid. Hoffman, in a series of experiments at Giessen, Germany and Upsala, Sweden, found that the time of the blooming of the Syringa vulgaris (common lilac) was April 29 at Giessen and June 17 at Upsala. The heat units received were 1,482 degrees and 1,433 degrees C., respectively, practically the same. In the first ripening of fruits, 11 species being considered, the ratio between the two places was as 100 to 82, while for the interval between the first bloom and the ripening of fruits the ratio was as 100 to 93. It is commonly observed, often to the great loss of the farmer, that seeds from plants brought into a northern country from the south produce plants which will not mature, for they are caught by the early frosts, while, vice versa, the northern plants in the south ripen far earlier than the native species. Thus it behooves the seeker after seed to stay as nearly as possible within his line of climatic latitude, or draw from a region slightly to the northward.

It has been found that the average daily temperature in the shade must be above 39.2 degrees F., for sugar cane, and 46.4 degrees F., for potatoes, if one desires to observe the effects of germination and growth. And the higher the temperature the quicker the germination and growth. Huberlandt found that with a temperature of 49.0 degrees it took beet seed twenty-two days to germinate, while with a temperature of 60.4 degrees only three and three-fourths days were necessary. With these plants, also, the maximum yields were secured by planting the 1st of May .ather than the 1st of March or April.

Rainfall is, next to temperature, the most important climatic element. The amount required for the growth of vegetation has been ascertained many times and for a large variety of plants, but with rainfall, as with temperature, there seems to be a wide range, possibly because plants adapt themselves to their environment. In addition to the amount of rainfall required, it is essential also to know the frequency of fall, the rapidity of fall, and the average amount of each fall. Thus a rainfall of 4 to 5 inches per month would, if it came in showers of a half to three-quarters of an inch, provide ample moisture for the most thirsty farm crop, but if the same amount were dashed down in one or two heavy showers, the result would not be favorable. Other points of value are the probability of rainfall, the length of time rain may reasonably be expected to continue after it has set in, the extent of the country covered, the temperature, humidity, sunshine and wind before and following the rain, the condition of the ground water, drainage, and composition of the soil, and the moisture characteristics of the plant.

Sunshine as a factor in plant growth is probably third in importance, and closely allied to temperature. It is usually determined by the inverse method, observations of clouds and cloudiness, rather than the actual sunshine, although of late years many of our stations are equipped with sunshine recorders, and the approximate hours of sunshine are obtained with a fair degree of accuracy.

The effect of sunshine in determining the form of plants is well known. If a plant germinate beneath a box, board, or stone it does not spread out at random, but takes the shortest path to the sunlight, where it spreads out in its usual form. The form and direction of growth of every branch, leaf, or shoot of a plant is controlled largely by its accessibility to the light. This is true even to the development of the branches, for these bud and grow where the leaves can unfold to the light with the least obstruction, and a symmetrical plant is usually an unobstructed one.

Just how much sunshine is essential has not been fully determined, so far as I can learn, but that plants differ much in their requirement, and also adapt themselves rapidly in this, as in temperature and moisture, is well known. An almost cloudless sky for months will not harm many plants if they have an abundance of moisture, and it is probable that others would be equally immune if they were gradually acclimated. Experiments in Paris carried on through a period of five years, in which sunshine, heat, rainfall, and evaporation were carefully measured from March to July, inclusive, showed that a considerable increase in crop yield was obtained when the percentage of sunshine was greatest, although at no time during the period was there a very marked difference in the amount of sunshine measured.

Other climatic elements which can be considered of value in relation to vegetation are wind direction, wind velocity, and evaporation. The wind direction and velocity of all parts of the United States have been determined with reasonable accuracy, and should be available to anyone seeking this information. The damaging effects of high winds can be largely controlled by the cultivation of wind-breaks. These will quickly and permaently prevent drifting of the soil, too rapid evaporation by high winds, broken and fallen grain, due to the same cause, and, to a considerable extent, winter killing. Professor King finds a marked decrease in the rate of evaporation for a considerable distance to the leeward of a row of trees or a hedge. He also recommends for a windy country, where light and comparatively porous soils predominate, small, narrow fields, with intervening fields of clover, alfalfa, or grass, for even these small plants serve as marked barrier in drifting soils.—*Chas. E. Linney, in Proceedings of Second Convention of Weather Bureau officials.*

NOTE AND COMMENT.

CHANGE OF ODOR IN JASMIN FLOWERS.—It has been noticed by those who grow the common jasmin that the flowers when first expanded, possess in a marked degree the delicious fresh odor which is characteristic of them. But as flowering progresses, the perfume becomes less delicate and the blooms are then very attractive to blue-bottle flies. This would appear to have some connection with the recorded formation of indol in the jasmin bloom as the process of flowering approaches completion.—*Scientific American.*

THE FRINGED GENTIAN A BIENNIAL.—Mr. Plitt who contributed an interesting article to the October *Botanist* will find his expectations result as he anticipates. More than ten years ago, Mr. George Redles contributed to the Germantown Horticultural Society, the knowledge of the biennial habit of the fringed gentian and both he and myself have possessed a "rare locality" in the "Wissahickon woods"— a noted locality here—by collecting seed and planting with judgment. Seeds planted one year develop the next, the plants blooming the second year. There has been no variation from this and we have followed this course for so many seasons with unvarying results that with us, the biennial character is beyond a doubt.—*Edwin C. Jellett, Germantown, Pa.*

A MIX-UP IN COMMON NAMES.—An amusing instance of the misunderstandings that may arise when only the common names of plants are used, and one that well teaches the value of a stable nomenclature, is furnished by two horticultural contemporaries. Some one sent the editor of the *Florist's Exchange* a box of papaw fruits (*Asimina triloba*) and asked if the difference in the amount of fruit borne by different trees was not due to imperfect or unisexual flowers. Upon his replying in the affimative the editor of *Indian Gardening* observes that they do not know every thing down in Ohio and that the papaw tree (which this time is (*Carica papaya*) bears the two kinds of flowers on separate trees. Each editor had a different tree in mind, but one common name characterized both.

HOW THE CHOKE-BERRY INCREASES.—The tangled thickets of choke-berry (*Pyrus melanocarpa*) are conspicuous features ot many swampy tracts, but only in a general way is it known how such thickets are formed. If one will take the trouble to dig up a specimen he will find that many of the roots, after running for some distance in the soil turn abruptly upward and form new stems. An old shrub with all its dependent progeny around it is a curious sight when uprooted. Its manner of life is exactly the reverse of the famous banyan tree whose branches produce roots. The choke-berry's method is only a variation of the penchant for producing suckers from the roots that is common to many of its nearest of kin. Some varities of the cultivated plum sucker so freely that they are not to be tolerated on a well kept lawn. The wil' crab also has the habit. Let but a single plant alone and it will produce a thicket in short order—a vast green pyramid, the tallest and oldest plants in the center, and grading down to the tender yearlings on the edges.

ALBINO FLOWERS.—When the slightest difference is noted and varying departures from original types are seized upon to enhance the reputation of their discoverers, why is it that the white variety of the chickory (*Cichorium intybus*) and the white variety of the moth mullein (*Verbascum blattaria*) are not distinctly named? Both these varieties are constant and in some localities are almost as plentiful as the standard types. Prof. Gray, many years ago gave a reason, but when less important variations in other classes of plants are recorded, it to me seems strange that differences so pronounced are passed.—*Edwin C. Jellett, Germantown, Pa.* [Most botanists look upon white flowers as albinos and the circumstances which produce them as analogous to those which cause albinism in animals. Less notice would therefore be taken of a white-flowered form of a species that normally produces colored flowers than if the flowers varied to some other color. Albino flowers are always of interest and the finding of such on species not before known to produce them should be recorded.—ED.]

ORIGIN OF NECTARIES.—The nectar is produced in the flower for the bees in order to secure a transfer of pollen—so we are told,—but how about the nectaries on other parts of the plant? Many plants have honey-glands at the base of the leaves and even the ferns, which never bear flowers and therefore have no pollen to carry, often have these glands. The common bracken (*Pteris aquilina*) is a conspicuous example. The truth is that our interpretation of each fact in plant-life as an adaptation of the plant looking toward its active advancement is probably erroneous. In the case of honey-glands on the leaf-stem it has been found that most, if not all of them, are merely excreting organs. The plant takes its crude materials from the water and air and in the chemical reaction necessary to form the material for its own use, certain other undesirable products are thrown off and these the plant promptly gets rid of by emptying them through the glands, If these excreted products happen to please the tastes of ant or fly it is so much their gain. The bracken has honey-glands at the base of each pinnule; but the male fern (*Nephrodium filix-mas*) of Europe and the marginal shield fern (*Nephrodium marginale*) of America, as if to show conclusively that the attraction of insects is not their real object, have similar glands in their rootstocks which empty inwardly into certain vacant spaces formed by the breaking down of several old cells. To return to the flower, it is probable that the nectaries were not evolved entirely with an eye to the bee; but that given a primitive honey-gland and an insect with a taste for sweets, bee and nectary have developed together.

AN AMERICAN PLANT CRAZE.—The craze for tulips that raged in Holland some three hundred years ago, is a matter of common knowledge. While it was at its height, two thousand dollars was frequently paid for a single bulb. That this mania had a parallel in America seems scarcely known. According to *The*

Scientific American, James I. of England who hated tobacco and was resolved to replace its culture in Virginia by the rearing of silk worms may be said to have started the mischief, but it was not until the Chinese mulberry (*Morus multicaulis*) began to be advocated as a food for the silk-worm that it assumed its alarming proportions. Silk-worms were raised in considerable numbers in Virginia and the coronation robe of Charles II. was made from such silk. In 1759, 10,000 pounds of raw silk was exported from Georgia. At first the worms were fed on the leaves of the white mulberry (*Morus alba*)but as soon as the qualities of the Chinese mulberry became known, a speculative fever seized upon all classes. It raged with particular virulence in Connecticut. Everybody expected to get rich in growing mulberry trees. At first these sold for three to five dollars a hundred, but the price rapidly advanced to five dollars each, and single trees were sold for as high as one hundred dollars. Cuttings were available for planting and slender switches, two feet long were sold for twenty-five dollars a dozen. The trees upon ten acres of land brought $38,000. So interested were the people in raising trees that the rearing of silk-worms was nearly forgotten. When the crash came many who had invested in the business were totally ruined. In the reaction that ensued the trees were pulled up and burned and in 1844 a violent storm followed by a general blight finished the mulberries and thus ended the culture of silk in America.

TORTOISES AND TOADSTOOLS.--It seems that man is not the only animal with a taste for the higher fungi. Dr. Harshberger in the October *Journal of Mycology* notes that the box tortoise (*Cistudo Virginica*) is very fond of the green russula (*R. virescens*) a toadstool not uncommon in America.

FRUIT OF YEW NOT POISONOUS.--In the September number, you ask if the fruit of the ground hemlock (*Taxus canadensis*) is poisonous. I would say that I know of at least six persons, including myself, who have eaten of the fruit without ill effects. One person says that she has even eaten a small handful at a time. The Century Dictionary says that the leaves of the yew are poisonous, but makes no mention of the fruit.--*Kate Harrison, Wellsboro, Pa.*

EDITORIAL.

It was formerly supposed that the newspapers had the exclusive right to publish startling and unfounded stories about plants, but of late the horticultural and floricultural publications seem inclined to enroach upon this field. That tropical weed the *Bryophyllum* a species allied to our common live-forever (*Sedum*) and often the base of amazing stories in the past, is again to the front in a paragraph to the effect that it is impossible to kill it. "You may chop it up into bits," says the article "and every piece will produce a new plant." The simple fact is that the leaves of the *Bryophyllum,* like those of the live-for-ever are rather tenacious of life and if they come in contact with moist soil even after severed from the plant, will produce new plantlets from buds on their margins. Another horticultural magazine gravely informs its readers that the grape-fruit (*Citrus decumana*) receives its common name from the fact that it grows "in grapose clusters." Everybody that has seen the grape-fruit growing knows that the fruits hang singly, like their near relatives the orange and lemon. "Grapose clusters" savors strongly of facts manufactured to fit the explanation.

In an article on walking sticks that orginiated in a magazine devoted to floriculture and has since been widely circulated, we are told that most walking sticks come from abroad and are towed to this country by various vessels in order that the salt water may harden them in transit. Without knowing positively that a bundle of walking sticks has never been dragged across the Atlantic in the wake of a steamer, the editor ventures the opinion that most skippers would prefer such cargoes inside their vessels and would even prefer to salt them, if need be, rather than have them flopping along behind.

These stories are harmless though absurd, but of a different nature is a recent article to the effect that every fruit carries with it plain indications of its beneficial or harmful nature. All fruits such as the apple which bear the marks of the blossom are to be eaten and all which do not are to be avoided. Such methods of distinguishing between the good and bad, however, are unreliable for there are nearly as many edible fruits that do not bear the marks of the blossom as there are fruits that do. Witness the cherry, plum, peach, tomato, gooseberry, currant and grape, to say nothing of such wildings as the mandrake, the cranberry and the elderberry. The one fact underlying this matter is that in temperate regions, the two families of plants that give us most of our edible fruits, happen to be the rose and heath families, both of which bear fruits crowned with the remains of the blossom. But in both these families there are fruits like the choke-berry (*Aronia nigra*) and the squaw huckleberry (*Vaccinium stamineum*) that are inedible.

The question why the general public should prefer articles of this kind to less startling and more truthful information is one that deserves more than a passing thought. It would seem that it cannot be ascribed entirely to ignorance, but has a deeper psychological origin inasmuch as mankind has always turned a credulous ear toward marvellous stories of plants and in their beliefs endowed many of them with supernatural powers. The legends of the mandrake and the elder of the mystic fernseed and the wonderful spring wurzel that would open any lock, are instances of beliefs once current. And while we no longer accept such stories for the truth a large number of people still hold to ideas concerning plants that are almost as incredible, or exhibit a willingness to believe extraordinary stories about them that is most surprising.

BOOKS AND WRITERS.

The reviewer rarely comes upon a book devoted to sciences other than botany that he cares to recommend to his readers, but in the case of Samuel J. Hunter's "Elementary Studies in Insect Life," published by Crane & Co., Topeka, Kansas, he feels that such a recommendation is not unwarranted. He does not remember to have seen a book devoted to insects that contained a greater number of related facts and that was written in a more charming manner than this one. The book is not a manual for identifying insects, although it contains an excellent key to the orders and principal families, but aims rather at developing some of the biological problems presented by the insect world. Such subjects are treated as metamorphosis, the special senses protective devices, solitary and social life, instinct, relation of plants and insects, friends and foes, the wealth of insect life, the habits of ants, form and function, etc., in all of which there is a vast amount of information of a character that those who are not entomologists will find it advantageous to know. There are two colored plates and 232 other illustrations, a large number of which are photographs from life. Many of the statements will be interesting to botanists aside from their entomological bearing as the one that records that it is sometimes difficult to obtain verbena blossoms because they are torn to pieces by the milkweed butterfly in withdrawing its proboscis from the flower; or that the grasshopper which spends much of its time on the lambs-quarter (*chenopodium album*) is marked with red, like the leaf. The one thing that will attract all plant lovers is the account of the pronuba moth fertilizing the yucca which is illustrated by flash-light photographs of the operation. The practical value of the book is exhibited in such parts as that devoted to injurious insects and how to deal with them and instructions for collecting and preserving specimens. The volume contains 344 pages and costs $1.25.

ASPECTS OF THE FOREST IN WINTER.--On the whole, winter is a far better season for walking in public parks than summer is. One sees much more of the broad scenery when the leaves have fallen. I need not say that the winter aspect of a forest, after a fresh fall of snow, or after cold rain has frozen upon every twig and lingering leaf is one of extraordinary beauty. Less understood is the beauty of bare trees, of the half frozen brook and of the blue shadows on the fields of snow.--*President Eliot of Harvard in Park and Cemetery.*

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